

GUIDE TO USING THE NCP PRODUCT SCHEDULE NOTEBOOK

AUGUST 2001

FOREWORD

The U.S. Environmental Protection Agency's (EPA) Oil Program Center has compiled the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) Product Schedule, as required by the Clean Water Act, the Oil Pollution Act of 1990 (OPA90), and the National Contingency Plan (NCP). This NCP Product Schedule Notebook contains a compilation of Product Bulletins summarizing technical information and test results for those products listed on EPA's NCP Product Schedule.

This edition of the NCP Product Schedule Notebook is being made available to emergency response personnel in EPA Regional Offices, U.S. Coast Guard (USCG) Offices, and State offices.

Manufacturers/contacts of products on the Schedule are required to amend their technical product bulletins whenever there are changes in product formulation, application rates, and handling procedures. **Updates to this Notebook, such as the addition of new products to the Schedule, or modifications and/or deletions of listed products, will be made every three months and indicated in bold.** EPA has implemented a change in the way these Notebook updates will be distributed. EPA will continue to make the Notebook updates available via CC:Mail and NOAA First Class; in addition, EPA will place the Notebook updates on the File Transfer Protocol (FTP). The FTP is an Internet protocol that allows users to obtain immediate access to large text files.

For further information, please leave a message on EPA's NCP Information Line at (202) 260-2342, or contact William Nichols (EPA Oil Program Center) at (703) 603-9918.

Written requests may be mailed to William Nichols 5203G, U.S. Environmental Protection Agency, Crystal Gateway #1, 1235 Jefferson Davis Highway, 12th Floor, Arlington, VA 22202.

ALPHABETICAL LISTING - NCP PRODUCT SCHEDULE NOTEBOOK

<u>PRODUCT</u>	<u>PRODUCT NUMBER</u>
ALSOCUP	M-23
AQUACLEAN	SW-16
BET BIOPETRO	B-48
BIOGEE HC	B-35
BIOSOLVE®	SW-20
BIOTA EARTH (see BR)	B-37
BR (formerly ENVIRO-ZYME BR)	B-37
B&S INDUSTRIAL (see STEP-ONE)	B-43
CHEAP INSURANCE	M-17
CLEAN SPLIT (see SPLIT DECISION SC)	SW-22
CN-110	SW-09
COREXIT 7664	SW-1
COREXIT 9500	D-4
COREXIT 9527	D-1
COREXIT 9580 SHORELINE CLEANER	SW-10
CYTOSOL	SW-19
DISPERSIT SPC 1000™	D-5
DO-ALL #18	SW-24
DUO-SPLIT (see SPLIT DECISION)	SW-22
ENZYT (LIQUID/CRYSTAL)	B-52
GOLD CREW SW	SW-26
INIPOL EAP 22	B-10
JD-109	D-6
JD-2000™	D-7
LAND AND SEA RESTORATION PRODUCT 001	B-55
MARE CLEAN 200 (formerly MARE CLEAN 505)	D-3
MARI-ZYME (see ZYME-FLOW)	M-18
MICRO-BLAZE	B-41
MICROBES HC (see BIOGEE HC)	B-35
NATURE'S WAY HS	SW-18
NATURE'S WAY PC (see NATURE'S WAY HS)	SW-18
NEOS AB 3000	D-2
OIL SPILL EATER II	B-53
OPPENHEIMER FORMULA	B-36
PES-51	M-12
PETRO-CLEAN	SW-23
PETRO-GREEN ADP-7	SW-17
PETROTECH 25	SW-21
POWERCLEAN (see NATURE'S WAY HS)	SW-18
PREMIER 99	SW-12

PRISTINE SEA II	B-54
PRP (Petroleum Remediation Product)	B-29
PX700	M-22
RAPIDGRAB 2000™	M-24
SC-1000™	SW-25
SEACARE E.P.A. (see DISPERSIT SPC)	D-5
SIMPLE GREEN	SW-15
SPLIT DECISION SC	SW-22
STEP ONE	B-43
SUPERALL #38 (see TOPSALL #30)	SW-2
SYSTEM E.T. 20	B-45
TOPSALL #30	SW-2
UNITED 658 PETRO-ZYME (see ZYME-FLOW)	M-18
VERSACLEAN (see Nature's Way HS)	SW-18
VB591™WATER, VB997™SOIL, and BINUTRIX (formerly MYCOBAC TX- 20)	B-42
WAPED (see PRP)	B-29
WASTE-SET #3200®	M-19
WASTE-SET #3400®	M-20
WMI-2000	B-19
ZYME-FLOW	M-18
ZYME-TREAT (see ZYME-FLOW)	M-18

NCP PRODUCT SCHEDULE NOTEBOOK LISTING BY PRODUCT TYPE

DISPERSANTS

COREXIT 9500	D-4
COREXIT 9527	D-1
DISPERSIT SPC 1000™	D-5
JD-109	D-6
JD-2000™	D-7
MARE CLEAN 200 (formerly Mare Clean 505)	D-3
NEOS AB 3000	D-2
SEACARE E.P.A. (see DISPERSIT SPC 1000™)	D-5

SURFACE WASHING AGENTS

AQUACLEAN	SW-16
BIOSOLVE®	SW-20
CLEAN SPLIT (see SPLIT DECISION SC)	SW-22
CN-110	SW-09
COREXIT 7664	SW-1
COREXIT 9580 SHORELINE CLEANER	SW-10
CYTOSOL	SW-19
DO ALL #18	SW-24
DUO-SPLIT (see SPLIT DECISION)	SW-22
GOLD CREW SW	SW-26
NATURE'S WAY HS	SW-18
NATURE'S WAY PC (see Nature's Way HS)	SW-18
PETRO-CLEAN	SW-23
PETRO-GREEN ADP-7	SW-17
PETROTECH 25	SW-21
POWERCLEAN (see NATURE'S WAY HS)	SW-18
PREMIER 99	SW-12
SC-1000™	SW-25
SIMPLE GREEN	SW-15
SPLIT DECISION SC	SW-22
SUPERALL #38 (see TOPSALL #30)	SW-2
TOPSALL #30	SW-2
VERSACLEAN	SW-18

SURFACE COLLECTING AGENTS

NONE LISTED

BIOREMEDIATION AGENTS

B&S INDUSTRIAL (see STEP ONE)	B-43
BET BIOPETRO	B-48
BIOGEE HC	B-35
BIOTA EARTH (see BR)	B-37
BR (formerly ENVIRO-ZYME BR)	B-37
ENZYT (LIQUID/CRYSTAL)	B-52
INIPOL EAP 22	B-10
LAND AND SEA RESTORATION PRODUCT 001	B-55
MICRO-BLAZE	B-41
OIL SPILL EATER II (OSE II)	B-53
OPPENHEIMER FORMULA	B-36
PRISTINE SEA II	B-54
PRP (Petroleum Remediation Product)	B-29
STEP ONE	B-43
SYSTEM E.T. 20 (formerly MCW.B.20)	B-45
VB591™WATER, VB997™SOIL, and BINUTRIX (formerly MYCOBAC TX- 20) ..	B-42
WAPED (see PRP)	B-29
WMI-2000	B-19

MISCELLANEOUS OIL SPILL CONTROL AGENTS

ALSOCUP	M-23
CHEAP INSURANCE	M-17
MARI-ZYME (see Zyme-Flow)	M-18
PES-51	M-12
PX700	M-22
RAPIDGRAB 2000™	M-24
UNITED 658 PETRO-ZYME (see Zyme-Flow)	M-18
WASTE-SET 3200®	M-19
WASTE-SET 3400®	M-20
ZYME-FLOW	M-18
ZYME-TREAT (see Zyme-Flow)	M-18

TECHNICAL PRODUCT BULLETIN #D-1
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: MARCH 10, 1978
REVISED LISTING DATE: DECEMBER 18, 1995
"COREXIT 9527"

I. NAME, BRAND, OR TRADEMARK

COREXIT 9527

Type of Product: Dispersant (Concentrate)

II. NAME, ADDRESS AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

Nalco/Exxon Energy Chemicals, LP

P.O. Box 87

Sugar Land, TX 77487-0087

Customer Services:

Phone: (281) 263-7205

(800) 333-3714

Fax: (281) 263-7149

24-hour Emergency Number:

(281) 263-7200

Product Management:

Phone: (281) 263-7736

(281) 263-7955

Mobile: (713) 854-1658

(Mr. Paul Hey)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

ABASCO

363 W. Canino Rd.

Houston, TX 77238-8573

Phone: (281) 931-4400

Nalco/Exxon Energy

Chemicals, L.P.

P.O. Box 87

Sugar Land, TX 77487-0087

Phone: (800) 333-3714

Nalco/Exxon Energy

Chemicals L.P.

P.O. Box 220

Long Beach, CA 90801

Phone: (310) 639-1553

Nalco/Exxon Energy

Chemical, L.P.

701 E. Tudor St, # 290

Anchorage, AK 99503

Phone: (907) 563-9866

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability:

COREXIT 9527 is not classified as flammable by either DOT or IMO regulations.

COREXIT 9527

2. Ventilation:

Avoid prolonged breathing of vapors. Use with ventilation equal to unobstructed outdoors in moderate breeze.

3. Skin and eye contact; protective clothing; treatment in case of contact:

Avoid eye contact. In case of eye contact, immediately flush eyes with large amounts of water for at least 15 minutes. Get prompt medical attention.

Avoid contact with skin and clothing. In case of skin contact, immediately flush with large amounts of water, and soap if available. Remove contaminated clothing, including shoes, after flushing has begun. If irritation persists, seek medical attention. For open systems where contact is likely, wear long sleeve shirt, chemical resistant gloves, and chemical protective goggles.

4.a. Maximum storage temperature: 170 F

4.b. Minimum storage temperature: -30 F

4.c. Optimum storage temperature range: 40 F to 100 F

4.d. Temperatures of phase separations and chemical changes:

COREXIT 9527 is not adversely affected by changes in storage temperature unless evaporation is allowed to occur.

V. SHELF LIFE

The shelf life of unopened drums of COREXIT 9527 is unlimited. Containers should always be capped when not in use to prevent contamination and evaporation of solvents.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method:

COREXIT 9527 is most effectively applied by aircraft, however, application with boat spray booms, boat fire monitors, and by hand held sprayers and back packs has been successfully done on a number of spills and trials.

Aerial Spraying - Aircraft provide the most rapid method of applying dispersants to an oil spill and a variety of aircraft can be used for spraying. For aerial spraying, COREXIT 9527 is applied undiluted. Typical application altitudes of 30 to 50 feet have been used, although higher altitudes may be effective under certain conditions. Actual effective altitudes will depend on the application equipment, weather and aircraft. Careful selection of spray nozzles is critical to achieve desired dose levels, since droplet size must be controlled. Many nozzles used for agricultural spraying are of low capacity and produce too fine a spray. A quarter-inch open pipe may be all that is necessary if the aircraft travels at 120 mph (104 knots) or more, since the air shear at these speeds will be sufficient to break the dispersant into the proper sized droplets.

Boat Spraying - COREXIT 9527 may be applied by workboats equipped with spray booms mounted ahead of the bow wake or as far forward as possible. The preferred and most effective method of application from a workboat is to use a low-volume, low-pressure pump so the chemical can be applied undiluted. Spray equipment designed to provide a five to ten percent diluted dispersant solution to the spray booms can also be used. COREXIT 9527 should be applied as droplets, not fogged or atomized. Natural wave or boat wake action usually provides adequate mixing energy to disperse the oil.

Recent tests have indicated that a fire monitor modified with a screen cap for droplet size may

also be useful for applying COREXIT 9527. Due to the increased volume output and the greater reach of the fire monitor, significantly more area can be covered in a shorter period of time.

System Calibration - Spray systems should be calibrated at temperatures anticipated to insure successful application and dosage control. Refer to Nalco/Exxon Energy Chemicals TECHNIFAX® TX-116 charts for calibrating application systems.

2. Concentration/Application Rate:

A treatment rate of about 2 to 10 U.S. gallons per acre, or a dispersant to oil ratio of 1:50 to 1: 10 is recommended. This rate varies depending on the type of oil, degree of weathering, temperature, and thickness of the slick.

3. Conditions for Use:

As with all dispersants, timely application ensures the highest degree of success. Early treatment with Corexit 9527, even at reduced treat rates, can reduce the "mousse" forming tendencies of the spilled oil. COREXIT 9527 is useful on oil spills in salt water.

VII. TOXICITY AND EFFECTIVENESS

1. Toxicity:

MATERIAL TESTED	SPECIES	LC50 (ppm)
COREXIT 9527	Menidia beryllina	14.57 96-hr
	Mysidopsis bahia	24.14 48-hr
No. 2 Fuel Oil	Menidia beryllina	10.72 96-hr
	Mysidopsis bahia	16.12 48-hr
COREXIT 9527 & No. 2 Fuel Oil (1:10)	Menidia beryllina	4.49 96-hr
	Mysidopsis bahia	6.60 48-hr
Reference toxicant (DSS)	Menidia beryllina	7.07 96-hr
	Mysidopsis bahia	9.82 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

2. Effectiveness

SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH LOUISIANA (S/L) AND PRUDHOE BAY (P/B) CRUDE OIL

VENDOR LAB REPORT

Oil	Effectiveness, %
Prudhoe Bay Crude	37.4%
South Louisiana Crude	63.4%
Average of Prudhoe Bay and South Louisiana Crudes	50.4 %

U.S. EPA OFFICE OF RESEARCH AND DEVELOPMENT REPORT

Oil	Effectiveness, %
Prudhoe Bay Crude	51%
South Louisiana Crude	31%

Average of Prudhoe Bay and South Louisiana Crudes

41%

EPA is reporting these numbers as an additional reference for On-Scene Coordinators (OSCs). EPA recognizes that large discrepancies may exist between lab results. EPA is currently working on revising the Swirling Flask Dispersant Effectiveness Test to facilitate more consistent results between labs and operators.

VIII. MICROBIOLOGICAL ANALYSIS

Not Applicable

IX. PHYSICAL PROPERTIES

1. Flash Point: 162 F
2. Pour Point: < - 45 F
3. Viscosity: 60 cst at 60 F, 22 cst at 100 F, 9 cst at 150 F
4. Specific Gravity: 0.995 at 60 F, 0.975 at 100 F
5. pH: 8.2 (10% in deionized water)
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: Water, Ethylene glycol monobutyl ether
8. Additives: Borate ester
9. Solubility: N/A

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.005
Cadmium	<0.01
Chromium	1.0
Copper	<0.2
Lead	<0.1
Mercury	<0.003
Nickel	<0.1
Zinc	0.1
Cyanide	<0.01
Chlorinated Hydrocarbons	<0.01

TECHNICAL PRODUCT BULLETIN #D-2
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: APRIL 22, 1985
REVISED LISTING DATE: JANUARY 26, 1996
"NEOS AB3000"

I. NAME, BRAND, OR TRADEMARK

NEOS AB3000

Type of Product: Dispersant (Hydrocarbon Based)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

NEOS Company Limited

Daisan Kendai Building

1-2, 3-chome Isobedori

Chuo-ku, Kobe, 651-0084 Japan

Phone: Kobe 078-331-9384

Telex: 5622293 JKNEOS J

Fax: Kobe 078-272-4649

(Mr. T. Ishii, Manager)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

NEOS Company Limited

Daisan Kendai Building

1-2, 3-chome Isobedori

Chuo-ku, Kobe, Japan

Phone: Kobe 078-331-9381

Telex: 5622293 JKNEOS J

Fax: Kobe 078-272-4649

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability:

NEOS AB3000 is flammable; keep away from open flame.

2. Ventilation:

Special ventilation is not required; however, natural ventilation is recommended.

3. Skin and eye contact; protective clothing; treatment in case of contact:

Contact may cause skin and eye irritation. Goggles and rubber clothing are recommended during application.

In case of contact with skin or eye, flush with copious amounts of fresh water. If severe, consult a doctor.

4.a. Maximum storage temperature: 158 F

4.b. Minimum storage temperature: 32 F

NEOS AB3000

4.c. Optimum storage temperature range: 50 to 140 F

4.d. Temperatures of phase separations and chemical changes:

Phase separation and chemical changes do not appear between the temperature range of 32 to 158 F.

V. SHELF LIFE

The shelf life is five (5) years.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method:

Spray neat concentrate on the oil slick in atomized form by means of a manual pump, or spray with a pump system incorporating an ejector system for drawing concentrate from the drum or stock tank.

For aerial application, use a spray boom with pressure nozzles or rotating atomizers mounted on helicopters or airplanes.

2. Concentration/Application Rate:

The application rate is 65 gallons of dispersant per ton of oil.

Five (5) to fifteen (15) parts of dispersant to suctioned water is recommended for ejector systems.

For aerial application, 75 to 125 gallons per ton of oil is recommended.

3. Conditions for Use:

NEOS AB3000 can be used for both fresh and sea water. It is effective with crude and residual heavy oil. The dispersant is also effective at controlling volatile emissions from the oil.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

MATERIAL TESTED	SPECIES	LC50 (ppm)
NEOS AB3000	Menidia beryllina	91.1 96-hr
	Mysidopsis bahia	33. 48-hr
No. 2 Fuel Oil	Menidia beryllina	201.8 96-hr
	Mysidopsis bahia	11.5 48-hr
NEOS AB3000 & No. 2 Fuel Oil (1:10)	Menidia beryllina	57. 96-hr
	Mysidopsis bahia	25. 48-hr
Reference toxicant (DSS)	Menidia beryllina	1.5 96-hr
	Mysidopsis bahia	9.3 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

b. EFFECTIVENESS*

SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH LOUISIANA (S/L) AND PRUDHOE BAY (P/B) CRUDE OIL

Oil	Effectiveness, %
Prudhoe Bay Crude	19.7 %

South Louisiana Crude	89.8 %
Average of Prudhoe Bay and South Louisiana Crudes	54.8 %

VIII. MICROBIOLOGICAL ANALYSIS

Not Applicable

IX. PHYSICAL PROPERTIES

1. Flash Point: No flash point to 212 F
2. Pour Point: Less than 32 F
3. Viscosity: 30.7 cSt at 104 F
4. Specific Gravity: 0.924 at 59 F
5. pH: 8.0 (5wt % aq., at 77 F)
6. Surface Active Agents: Nonionic and Cationic surfactants
7. Solvents: Paraffins
8. Additives: None
9. Solubility: Not Applicable

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.1
Cadmium	<0.1
Chromium	0.26
Copper	<0.05
Lead	0.21
Mercury	<0.001
Nickel	0.076
Zinc	1.1
Cyanide	<0.05
Polychlorinated Biphenyls	<0.10

TECHNICAL PRODUCT BULLETIN #D-3
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: FEBRUARY 23, 1988
REVISED LISTING DATE: JANUARY 26, 1996
"MARE CLEAN 200"
(formerly Mare Clean 505)

I. NAME, BRAND, OR TRADEMARK

Mare Clean 200

Type of Product: Dispersant (Solvent-Based)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

Taiho Industries Co. Ltd.

21-44, 2-chome, Takanawa

Minatoku, Tokyo, Japan

Phone: (81) 33-445-8111

Fax: (81) 33-443-6333

(Mr. Y. Abe)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

Klinview Corporation

8001 Irvine Center Drive, Suite 450

Irvine, CA 92718

Phone: (714) 753-0821

Fax: (714) 753-0812

(Mr. T. Tanaka)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability:

The flash point is 212 ± 20 F

2. Ventilation:

Is required. Use in closed room is not recommended.

3. Skin and eye contact; protective clothing; treatment in case of contact:

Use protective goggles to avoid eye contact. In case of eye contact, wash immediately with plenty of water and consult with physician.

4.a. Maximum storage temperature: 122 F

4.b. Minimum storage temperature: 21 F

4.c. Optimum storage temperature range: 32 F to 86 F

4.d. Temperatures of phase separations and chemical changes:

Phase separation does not relate to temperatures. Chemical changes may occur at temperatures

MARE CLEAN 200

above 194 F.

V. SHELF LIFE

The shelf life of MARE CLEAN 200 is 10 years when stored indoors. (Container will deteriorate before contents.)

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method:

Sprinkle the dispersant on the oil spill, then 5-10 minutes later stir the surface intensively. For convenience, MARE CLEAN 200 may be diluted with water if desired.

2. Concentration/Application Rate:

Use 53-66 gallons of MARE CLEAN 200 per ton of oil

3. Conditions for Use:

The performance of MARE CLEAN 200 is not affected by water salinity. At temperatures below 40 F or in case of heavy crude oil spill, MARE CLEAN 200 should be used without dilution. MARE CLEAN 200 is an effective dispersant for any liquid hydrocarbon.

VII. TOXICITY AND EFFECTIVENESS

1. TOXICITY:

MATERIAL TESTED	SPECIES	LC50 (ppm)
MARE CLEAN 200	Menidia beryllina	1996 96-hr
	Mysidopsis bahia	938 48-hr
No. 2 Fuel Oil	Menidia beryllina	10.72 96-hr
	Mysidopsis bahia	16.12 48-hr
MARE CLEAN 200 and No. 2 Fuel Oil (1:10)	Menidia beryllina	42 96-hr
	Mysidopsis bahia	9.84 48-hr
Reference Toxicant (SDS)	Menidia beryllina	7.07 96-hr
	Mysidopsis bahia	9.82 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

b. EFFECTIVENESS*

Swirling flask dispersant effectiveness test with South Louisiana and Prudhoe Bay Crude Oils

Oil	Effectiveness, %
Prudhoe Bay Crude	63.97%
South Louisiana Crude	84.14%
Average of Prudhoe Bay and South Louisiana Crudes	74.06%

VIII. MICROBIOLOGICAL ANALYSIS

Not Applicable

IX. PHYSICAL PROPERTIES

1. Flash Point: 212 ± 20 F
2. Pour Point: 14 ± 10 F
3. Viscosity: 2.4 ± 5 cst at 104 F
4. Specific Gravity: 0.95 ± 0.03 at 77 F
5. pH: 7.7 ± 1.0 (10% solution)
6. Surface Active Agents:
A mixture of sorbitan fatty acid esters, polysorbates, and polyoxyethylene fatty acid esters.
7. Solvents: Paraffinic hydrocarbons (CAS 74664-93-0)
8. Additives: None
9. Solubility: Not applicable

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.50
Cadmium	<0.100
Chromium	<0.500
Copper	<0.250
Lead	<2.50
Mercury	<0.0200
Nickel	<0.250
Zinc	0.611
Cyanide	<0.01

TECHNICAL PRODUCT BULLETIN #D-4
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: APRIL 13, 1994
REVISED LISTING DATE: DECEMBER 18, 1995
"COREXIT 9500"

I. NAME, BRAND, OR TRADEMARK
COREXIT 9500 (EC9500A)
Type of Product: Dispersant

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Nalco/Exxon Energy Chemicals, LP
P.O. Box 87
Sugar Land, TX 77487-0087
Customer Services:
Phone: (281) 263-7205
(800) 333-3714
Fax: (281) 263-7149
24-hour Emergency Number:
(281) 263-7200
Product Management:
Phone: (281) 263-7736
(281) 263-7955
Mobile: (713) 854-1658
(Mr. Paul Hey)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

ABASCO	Nalco/Exxon Energy
363 W. Camino Road	Chemicals, L.P.
Houston, TX 77238-8573	P.O. Box 87
Phone: (281) 931-4400	Sugar Land, TX 77487-0087
	Phone: (800) 333-3714

Nalco/Exxon Energy	Nalco/Exxon Energy
Chemicals, L.P.	Chemical, L.P.
P.O. Box 220	701 E. Tudor St., #290
Long Beach, CA 90801	Anchorage, AK 99503
Phone: (310) 639-1553	Phone: (907) 563-9866

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

COREXIT 9500

1. Flammability:

IMO - Non-flammable; DOT - Non-hazardous.

2. Ventilation:

Use with ventilation equal to unobstructed outdoors in moderate breeze.

3. Skin and eye contact; protective clothing; treatment in case of contact:

Avoid eye contact. In case of eye contact, immediately flush eyes with large amounts of water for at least 15 minutes. Get prompt medical attention.

Avoid contact with skin and clothing. In case of skin contact, immediately flush with large amounts of water, and soap if available. Remove contaminated clothing, including shoes, after flushing has begun. If irritation persists, seek medical attention.

For open systems where contact is likely, wear long sleeve shirt, chemical resistant gloves, and chemical protective goggles.

4.a. Maximum storage temperature: 170F

4.b. Minimum storage temperature: -30F

4.c. Optimum storage temperature range: 40F to 100F

4.d. Temperatures of phase separations and chemical changes: None

V. SHELF LIFE

The shelf life of unopened drums of COREXIT 9500 is unlimited. Containers should always be capped when not in use to prevent contamination and evaporation of solvents.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method:

COREXIT 9500 is a high performance, biodegradable oil spill dispersant concentrate that is effective on a wide range of oils. COREXIT 9500 contains the same surfactants present in COREXIT 9527 and a new improved oleophilic solvent delivery system.

Aerial Spraying - Aircraft provide the most rapid method of applying dispersants to an oil spill and a variety of aircraft can be used for spraying. For aerial spraying, COREXIT 9500 is applied undiluted. Typical application altitudes of 30 to 50 feet have been used, although higher altitudes may be effective under certain conditions. Actual effective altitudes will depend on the application equipment, weather and aircraft. Careful selection of spray nozzles is critical to achieve desired dose levels, since droplet size must be controlled. Many nozzles used for agricultural spraying are of low capacity and produce too fine a spray. A quarter-inch open pipe may be all that is necessary if the aircraft travels at 120 mph (104 knots) or more, since the air shear at these speeds will be sufficient to break the dispersant into the proper sized droplets.

Boat Spraying - COREXIT 9500 may also be applied by workboats equipped with spray booms mounted ahead of the bow wake or as far forward as possible. The preferred and most effective method of application from a workboat is to use a low-volume, low-pressure pump so the chemical can be applied undiluted. Spray equipment designed to provide a five to ten percent diluted dispersant solution to the spray booms can also be used. COREXIT 9500 should be applied as droplets, not fogged or atomized. Natural wave or boat wake action usually provides

COREXIT 9500

adequate mixing energy to disperse the oil.

Recent tests have indicated that a fire monitor modified with a screen cap for droplet size control may also be useful for applying COREXIT 9500. Due to the increased volume output and the greater reach of the fire monitor, significantly more area can be covered in a shorter period of time.

System Calibration - Spray systems should be calibrated at temperatures anticipated to insure successful application and dosage control. Application at sub-freezing temperatures may require larger nozzle, supply lines and orifices due to higher product viscosity. Refer to Nalco/Exxon Energy Chemical's TECHNIFAX® TX-116 charts for calibration information.

2. Concentration/Application Rate:

A treatment rate of about 2 to 10 U.S. gallons per acre, or a dispersant to oil ratio of 1:50 to 1:10 is recommended. This rate varies depending on the type of oil, degree of weathering, temperature, and thickness of the slick.

3. Conditions for Use:

As with all dispersants, timely application ensures the highest degree of success. Early treatment with COREXIT 9500, even at reduced treat rates, can also counter the "mousse" forming tendencies of the spilled oil. Thus, with the enhanced penetration capability and emulsion fighting properties, the "window of opportunity" to successfully treat the spill is increased with COREXIT 9500.

COREXIT 9500 is useful on oil spills in salt water.

VII.

1. TOXICITY

MATERIAL TESTED	SPECIES	LC50 (ppm)
COREXIT 9500	Menidia beryllina	25.20 96-hr
	Mysidopsis bahia	32.23 48-hr
No. 2 Fuel Oil	Menidia beryllina	10.72 96-hr
	Mysidopsis bahia	16.12 48-hr
COREXIT 9500 and No. 2 Fuel Oil (1:10)	Menidia beryllina	2.61 96-hr
	Mysidopsis bahia	3.4 48-hr
Reference Toxicant (SDS)	Menidia beryllina	7.07 96-hr
	Mysidopsis bahia	9.82 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

2. EFFECTIVENESS*

SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH
LOUISIANA (S/L) AND PRUDHOE BAY (P/B) CRUDE OILS

VENDOR LAB REPORT

COREXIT 9500

Oil	Effectiveness, %
Prudhoe Bay Crude	45.3%
South Louisiana Crude	54.7%
Average of Prudhoe Bay and South Louisiana Crudes	50.0 %
U.S. EPA OFFICE OF RESEARCH AND DEVELOPMENT REPORT	
Oil	Effectiveness, %
Prudhoe Bay Crude	49.4%
South Louisiana Crude	45.4%
Average of Prudhoe Bay and South Louisiana Crudes	47.4%

EPA is reporting these numbers as an additional reference for On-Scene Coordinators (OSCs). EPA recognizes that large discrepancies may exist between lab results. EPA is currently working on revising the Swirling Flask Dispersant Effectiveness Test to facilitate more consistent results between labs and operators.

VIII. PHYSICAL PROPERTIES

1. Flash Point: 176F (SETA closed cup; ASTM D3278)
2. Pour Point: -70F (ASTM D97)
3. Viscosity: 55 cSt (at 68F)
4. Specific Gravity: 0.949 (at 60F, ASTM D1963)
5. pH: 6.4
6. Chemical Name and Percentage by Weight of the Total Formulation: CONFIDENTIAL
7. Surface Active Agents: CONFIDENTIAL
8. Solvents: CONFIDENTIAL
9. Additives: None
10. Solubility: Soluble in fresh water, but dispersable in sea water

IX. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

COMPOUND	CONCENTRATION (ppm)
Arsenic	0.16
Cadmium	N/D
Chromium	0.03
Copper	0.10
Lead	N/D
Mercury	N/D
Nickel	N/D
Zinc	N/D
Cyanide	N/D
Chlorinated hydrocarbons	N/D
N/D = Not detected	

COREXIT 9500

TECHNICAL PRODUCT BULLETIN #D-5
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: APRIL 22, 1999
REVISED LISTING DATE:
"DISPERSIT SPC 1000™"
(a/k/a Seacare Ecosperse™ Pollution Abatement (E.P.A.))

I. NAME, BRAND, OR TRADEMARK
DISPERSIT SPC 1000™
Type of Product: Dispersant (Water Based)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
U.S. Polychemical Corp.
584 Chestnut Ridge Road
Chestnut Ridge, NY 10977
Phone: (914) 356-5530 (Mr. Robert E. Bergman, Jr. CFO)
Fax Number: (914) 356-6656

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Maritime Solutions, Inc.
17 Battery Pl. Suite 913
New York, NY 10004
Phone: (212) 747-9044 (Mr. Chris Constantine / Mr. Richard Fredricks)
Fax Number: (212) 747-9240

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability:
IMO: Non-flammable
DOT: Non-hazardous
2. Ventilation:
None normally required. Adequate to maintain fume levels below the TLV.
3. Skin and eye contact:
Avoid prolonged contact with skin and eyes. Flush eyes with plenty of water for at least 15 minutes. Get medical attention. Wear long sleeve shirt, chemical resistant gloves, and chemical protective goggles in case of exposure to mist.
- 4.a. Maximum storage temperature: 180F
- 4.b. Minimum storage temperature: -25F
- 4.c. Optimum storage temperature range: 40F to 140F
- 4.d. Temperatures of phase separations and chemical changes: None

DISPERSIT SPC 1000™

V. SHELF LIFE

The shelf life of Dispersit SPC 1000™ is unlimited in unopened containers. Containers must be kept closed when not in use to prevent contamination.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method:

The dispersant may be applied by any conventional methods such as 1) aerial spraying and 2) boat spraying to accommodate weather conditions.

2. Concentration/Application Rate:

A dispersant to oil ratio ranging from 1 part dispersant to 50 parts oil to 1 part dispersant to 10 parts oil; or an application rate of about 2-10 gallons (7.6 liters- 37.9 liters) per acre (4840 square meters) is suggested. These rates will be dependent on the type of oil, degree of weathering, temperature and extent of oil slick.

3. Conditions for Use:

Timely application ensures the highest degree of successful dispersion of the oil spill.

VII. TOXICITY AND EFFECTIVENESS

1. TOXICITY

MATERIAL TESTED	SPECIES	LC50 (ppm)
DISPERSIT SPC 1000™	Menidia beryllina	3.5 96-hr
	Mysidopsis bahia	16.6 48-hr
No. 2 Fuel Oil	Menidia beryllina	11.6 96-hr
	Mysidopsis bahia	11.7 48-hr
DISPERSIT SPC 1000™ & No. 2 Fuel Oil (1:10)	Menidia beryllina	7.9 96-hr
	Mysidopsis bahia	8.2 48-hr
Reference Toxicant (SDS)	Menidia beryllina	6.3 96-hr
	Mysidopsis bahia	11.7 48-hr

2. EFFECTIVENESS:

SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH LOUISIANA (S/L) AND PRUDHOE BAY (P/B) CRUDE OIL

VENDOR LAB REPORT

Oil	Effectiveness, %
Prudhoe Bay Crude	40%
South Louisiana Crude	105%
Average of Prudhoe Bay and South Louisiana Crudes	73%

U.S. EPA OFFICE OF RESEARCH AND DEVELOPMENT REPORT

Oil	Effectiveness, %
Prudhoe Bay Crude	52%
South Louisiana Crude	49.7%
Average of Prudhoe Bay and South Louisiana Crudes	51%

DISPERSIT SPC 1000™

EPA is reporting these numbers as an additional reference for On-scene Coordinators (OSCs). EPA recognizes that large discrepancies may exist between lab results. EPA is currently working on revising the Swirling Flask Dispersant Effectiveness Test to facilitate more consistent results between labs and operators.

VIII. MICROBIOLOGICAL ANALYSIS

Not applicable

IX. PHYSICAL PROPERTIES

1. Flash Point, ASTM D-56-87: 208F
2. Pour Point, ASTM D-97-87: <-20C
3. Viscosity, ASTM D-445-88: 144CPS, @ 68F
4. Specific Gravity, ASTM D-1298-85(90): 0.995, @ 68F
5. pH, ASTM D-1293-84(90): 10.0
6. Surface Active Agents: Anionic and non-ionic, proprietary, surfactants
7. Solvents: Proprietary, non-petroleum based
8. Additives: None
9. Solubility in Water: Complete

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

COMPOUND	CONCENTRATION (mg/L)
Arsenic	<1.00
Cadmium	<2.00
Chromium	<2.00
Copper	<2.00
Lead	<1.00
Mercury	<0.04
Nickel	<10.00
Zinc	<2.00
Cyanide	N/D
Chlorinated Hydrocarbons	N/D

TECHNICAL PRODUCT BULLETIN #D-6
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: SEPTEMBER 20, 2000
REVISED LISTING DATE:
"JD-109"

I. NAME, BRAND, OR TRADEMARK

JD-109

Type of Product: Dispersant

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

Vopak (formerly Van Waters and Rogers)

4600 Dues Dr.

Cincinnati, OH 45246-1009

(513) 874-0970 (Manufacturer Fax Contact Barbara Thompson)

(937) 643-1796 (Sales Contact Mike Peterson)

(937) 643-1861 (Sales Fax)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

GlobeMark Resources Ltd.

7 Collingwood Ave.

Dayton, OH 45419

Phone: (937) 643-1796

Fax: (937) 643-1861

(Mike Peterson/Joannie Doctor)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability:

IMO - Nonflammable; DOT - Nonhazardous

2. Ventilation:

Use with ventilation equal to unobstructed outdoors in a moderate breeze.

3. Skin and eye contact, protective clothing, treatment in case of contact:

Avoid skin and clothing contact. If skin contact occurs, immediately wash with large amounts of soap and water (if possible). Remove any contaminated clothing and shoes. Launder before reusing. If irritation persists, seek medical assistance. For areas where contact is likely, wear long sleeve shirt, chemical resistant gloves, and chemical resistant goggles.

4.a. Maximum storage temperature: 120°F

4.b. Minimum storage temperature: - 4°F

4.c. Optimum storage temperature range: 32°F to 90°F

4.d. Temperatures of phase separations and chemical changes: None

V. SHELF LIFE

The shelf life of unopened drums of JD-109 is unlimited. Containers should be capped when not being used to prevent contamination and evaporation.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method: JD-109 is an oil spill dispersant concentrate that is specifically formulated where maximum efficiency is required. It is low foaming and free of aromatics and phosphates. The most rapid and effective method of applying JD-109 to a oil spill is by spraying. Temperature ranges for application should not drop below 32°F or exceed 120°F.

Aerial Spraying - Typical application altitudes of 30 to 50 feet are advised although higher altitudes may be used if conditions warrant. Spray nozzle should be about ¼ inches in diameter flying at 104 knots or more to create enough water shear sufficient to break the dispersant into proper sized droplets. ½ inch diameter nozzle may be needed for temperatures below 50°F.

Boat Spraying - JD-109 can also be applied by workboats with spray booms mounted as far forward as possible of the bow or wake. The most effective application from a workboat is a low-volume, low-pressure pump.

2. Concentration/Application Rate: A treatment rate of about 2 to 10 US gallons (7.6 to 37.9 liters) per acre (4,840 square meters) or a dispersant to oil ratio of 1:50 to 1:10 is recommended. The rate may vary depending on the type of oil, degree of weathering, temperature and thickness of slick.

3. Conditions for Use: As with any oil related spill, timely application of a dispersant will ensure the highest degree of success. Timely treatment with JD-109, even at low application rates, can counter the “mousse” forming effect of the spilled oil. The special formulation of JD-109 may extend the “limited time factor” to successfully treat the spill.

VII. TOXICITY AND EFFECTIVENESS

1. Toxicity

MATERIAL TESTED	SPECIES	LC50 (ppm)
JD-109	Menidia beryllina	1.9 96-hr
	Mysidopsis bahia	1.18 48-hr
No. 2 Fuel Oil	Menidia beryllina	9.35 96-hr
	Mysidopsis bahia	3.13 48-hr
JD-109 & No. 2 Fuel Oil	Menidia beryllina	3.84 96-hr
	Mysidopsis bahia	3.51 48-hr
Reference Toxicant (SRT)	Menidia beryllina	2.63 96-hr
	Mysidopsis bahia	8.06 48-hr

2. Effectiveness:

SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH LOUISIANA (S/L) AND PRUDHOE BAY (P/B) CRUDE OIL

VENDOR LAB REPORT

Oil	Effectiveness, %
Prudhoe Bay Crude	26%
South Louisiana Crude	91%
Average of Prudhoe Bay and South Louisiana Crudes	58.5 %

U.S. EPA OFFICE OF RESEARCH AND DEVELOPMENT REPORT

Oil	Effectiveness, %
Prudhoe Bay Crude	30.02%
South Louisiana Crude	52.84%
Average of Prudhoe Bay and South Louisiana Crudes	41.43%

EPA is reporting these numbers as an additional reference for On-scene Coordinators (OSCs). EPA recognizes that large discrepancies may exist between lab results. EPA is currently working on revising the Swirling Flask Dispersant Effectiveness Test to facilitate more consistent results between labs and operators.

VIII. MICROBIOLOGICAL ANALYSIS

Not Applicable

IX. PHYSICAL PROPERTIES

1. Flash Point, ASTM D3278-89: 93°C
2. Pour Point, ASTM D97-87: -19°C
3. Viscosity, ASTM D445-88: 202.9 cst
4. Specific Gravity, ASTM D1298-85 (90): 1.02
5. pH, ASTM D1293-84 (90): 9.45
6. Surface Active Agents: Anionic and nonionic, proprietary, surfactants
7. Solvents: Proprietary, ester based
8. Additives: None
9. Solubility in Water: Miscible in oil, water, and solvents

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

COMPOUND	CONCENTRATION (mg/kg)
Arsenic	<10
Cadmium	<10
Chromium	<10
Copper	<10
Lead	<10
Mercury	<1
Nickel	<10
Zinc	<10

Cyanide	<0.5
Chlorinated Hydrocarbons	<1.4

TECHNICAL PRODUCT BULLETIN #D-7
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: AUGUST 06, 2001
"JD-2000™"

I. NAME, BRAND, OR TRADEMARK

JD-2000™

Type of Product: Dispersant

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

Vopak (formerly Van Waters and Rogers)

4600 Dues Dr.

Cincinnati, OH 45246-1009

(513) 874-0970 (Manufacturer Fax Contact Barbara Thompson)

(937) 643-1796 (Sales Contact Mike Peterson)

(937) 643-1861 (Sales Fax)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

GlobeMark Resources Ltd.

7 Collingwood Ave.

Dayton, OH 45419

Phone: (937) 643-1796

Fax: (937) 643-1861

(Mike Peterson/Joannie Docter)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability:

IMO - Non-flammable. This product is not regulated by DOT when shipped domestically by land.

2. Ventilation:

Use with ventilation equal to unobstructed outdoors in a moderate breeze.

3. Skin and eye contact; protective clothing; treatment in case of contact:

Avoid skin and clothing contact. If skin contact occurs, immediately wash with large amounts of soap and water (if possible). Remove any contaminated clothing and shoes. Launder before reusing. If irritation persists, seek medical assistance. For areas where contact is likely, wear long sleeve shirt, chemical resistant gloves, and chemical resistant goggles.

4.a. Maximum storage temperature: 120°F

b. Minimum storage temperature: -30°F

c. Optimum storage temperature range: 30°F to 90°F

d. Temperatures of phase separations and chemical changes: None

JD-2000™

V. SHELF LIFE

The shelf life of unopened drums of JD-2000™ is unlimited. Containers should be capped when not being used to prevent contamination and evaporation. Opened container should be used within 1 year for optimal performance. Poly containers are recommended for storage near wet environments, i.e., ships, harbors, ports, etc.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method: JD-2000™ is free of phosphates, aromatic chlorinated solvents, branched ethoxylated alcohols, and hydrotreated distillates. JD-2000™ is highly effective on a wide range of oil spills for soil and water application. Optimum temperature for application is above 30°F. Aerial Spraying - Typical application altitudes of 30 to 50 feet are advised although higher altitudes may be used if conditions warrant. Spray nozzle should be about ¼ inch in diameter flying at 104 knots or more to create enough air shear sufficient to break the dispersant into proper sized droplets. A ½ inch diameter nozzle may be needed for temperatures from 30°F to 30°F.

Boat Spraying - JD-2000™ can also be applied by workboats with spray booms mounted as far forward as possible of the bow or wake. The most effective application from a workboat is a low-volume, low-pressure pump.

2. Concentration/Application Rate: JD-2000™ is an oil spill dispersant concentrate that may be diluted by 5 to 10 percent with water if needed. A treatment rate of about 2 to 10 U.S. gallons (7.6 to 37.9 liters) per acre (4,840 square meters) or a dispersant to oil ratio of 1:50 to 1:10 is recommended. The rate may vary depending on the type of oil, degree of weathering, temperature, and thickness of slick.

3. Conditions for Use: As with any oil related spill, timely (preferably within 48 hours) application of a dispersant will ensure the highest degree of success. Timely treatment with JD-2000™, even at low application rates, can counter the “mousse” forming effect of the spilled oil. The special formulation of JD-2000™ may extend the “limited time factor” to successfully treat the spill.

VII. TOXICITY AND EFFECTIVENESS

1. Toxicity

MATERIAL TESTED	SPECIES	LC50 (ppm)
JD-2000™	Menidia beryllina	407.00 96-hr
	Mysidopsis bahia	90.50 48-hr
No. 2 Fuel Oil	Menidia beryllina	8.39 96-hr
	Mysidopsis bahia	2.58 48-hr
JD-2000™ & No. 2 Fuel Oil (1:10)	Menidia beryllina	3.59 96-hr
	Mysidopsis bahia	2.19 48-hr
Reference Toxicant (SDS)	Menidia beryllina	2.22 96-hr
	Mysidopsis bahia	10.50 48-hr

2. Effectiveness:

SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH LOUISIANA (S/L) AND PRUDHOE BAY (P/B) CRUDE OIL

VENDOR LAB REPORT

Oil	Effectiveness, %
Prudhoe Bay Crude	60.4%
South Louisiana Crude	77.8%
Average of Prudhoe Bay and South Louisiana Crudes	69.1 %

U.S. EPA OFFICE OF RESEARCH AND DEVELOPMENT REPORT

Oil	Effectiveness, %
Prudhoe Bay Crude	38.8%
South Louisiana Crude	84.1%
Average of Prudhoe Bay and South Louisiana Crudes	61.42%

EPA is reporting these numbers as an additional reference for On-Scene Coordinators (OSCs). EPA recognizes that large discrepancies may exist between lab results. EPA is currently working on revising the Swirling Flask Dispersant Effectiveness Test to facilitate more consistent results between labs and operators.

VIII. MICROBIOLOGICAL ANALYSIS

Not Applicable

IX. PHYSICAL PROPERTIES

- | | |
|--|----------|
| 1.Flash Point (SW1010): | 212°F |
| 2.Pour Point (ASTM D97): | -36°F |
| 3.Viscosity (ASTM D445): | 65.2 cst |
| 4.Specific Gravity 60/60 (ASTM D287): | 0.99 |
| 5.pH (EPA 150.1): | 7.54 |
| 6.Surface Active Agents: Confidential | |
| 7.Solvents: Confidential | |
| 8. Additives: None | |
| 9.Solubility in Water: Dispersible in fresh and salt water. Miscible in oil, water, and solvents | |

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

COMPOUND	CONCENTRATION (mg/kg)
Arsenic	ND
Cadmium	ND
Chromium	ND
Copper	ND

Lead	0.43
Mercury	ND
Nickel	ND
Zinc	0.11
Cyanide	ND
Chlorinated Hydrocarbons	ND

TECHNICAL PRODUCT BULLETIN #SW-1 (formerly D-4)
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: NOVEMBER 1, 1978
REVISED LISTING DATE: SEPTEMBER 27, 1995
"COREXIT 7664"

I. NAME, BRAND, OR TRADEMARK
COREXIT 7664 (EC 7664A)
Type of Product: Surface Washing Agent (Water Based)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Nalco/Exxon Energy Chemicals, LP
P.O. Box 87
Sugar Land, TX 77487-0087
Customer Services:
Phone: (281) 263-7205
(800) 333-3714
Fax: (281) 263-7149
24-hour Emergency Number:
(281) 263-7200
Product Management:
Phone: (281) 263-7736
(281) 263-7955
Mobile: (713) 854-1658
(Mr. Paul Hey)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

ABASCO	Nalco/Exxon Energy
363 W. Canino Rd.	Chemicals, L.P.
Houston, TX 77238-8573	P.O. Box 87
Phone: (281) 931-4400	Sugar Land, TX 77487-0087
	Phone: (800) 333-3714

Nalco/Exxon Energy	Nalco/Exxon Energy
Chemicals L.P.	Chemical, L.P.
P.O. Box 220	701 E. Tudor St, # 290
Long Beach, CA 90801	Anchorage, AK 99503
Phone: (310) 639-1553	Phone: (907) 563-9866

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability:

The flash point of COREXIT 7664 is 116 F. It is therefore classified as flammable by IMO rules,

COREXIT 7664

but not by DOT rules. Keep away from heat, sparks, and open flame.

2. Ventilation:

Avoid prolonged breathing of vapors. Use with ventilation equal to unobstructed outdoors in moderate breeze.

3. Skin and eye contact; protective clothing; treatment in case of contact:

Avoid contact with skin or eyes and breathing mist or vapors. The use of gloves and goggles is recommended. In case of contact flush exposed area with water.

4.a. Maximum storage temperature: 130 F

4.b. Minimum storage temperature: 10 F

4.c. Optimum storage temperature range: 40 F to 100 F

4.d. Temperatures of phase separations and chemical changes:

No phase separations or chemical changes are expected unless evaporation is allowed to occur.

V. SHELF LIFE

The shelf life of unopened drums of COREXIT 7664 is unlimited. Partially used containers should be kept tightly closed to retard evaporation of solvents.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method:

Spray from boats, aircraft, fire education systems on boats, helicopter buckets, hand-held or backpack sprayers, or from hoses attached to small pumps. COREXIT 7664 should be applied in the form of small droplets - never as a fog or mist.

2. Concentration/Application Rate:

COREXIT 7664 diluted 1-3 percent in water sprayed on the shoreline before the oil comes ashore will protect the beaches, marshes, rocks, etc. from oil contamination. Full strength COREXIT 7664 can be sprayed onto the surf which washes the shoreline.

3. Conditions for Use:

COREXIT 7664 (1-3% in water) will protect beaches, marshes, rocks, and other shoreline structures from oil contamination if applied before the oil comes in contact with them. The dilute solution is sprayed on the shoreline area. COREXIT 7664 is also useful in washing oil from beaches, sea walls, docks, boats, and spill cleanup equipment. Use a 1-3% solution of COREXIT 7664 in water, and apply from portable sprayers. If oil deposits are heavy or weathered, a short pre-soak with a hydrocarbon-based shoreline cleaner like COREXIT 9580 is recommended.

VII. TOXICITY:

Material tested	Species	LC50 (ppm)
COREXIT 7664	Menidia beryllina	87.06 96-hr
	Mysidopsis bahia	583.91 48-hr
No. 2 Fuel Oil	Menidia beryllina	10.72 96-hr
	Mysidopsis bahia	16.12 48-hr
COREXIT 7664 & No. 2 Fuel Oil (1:10)	Menidia beryllina	15.16 96-hr
	Mysidopsis bahia	18.34 48-hr

Reference Toxicant	Menidia beryllina	7.02 96-hr
(DSS)	Mysidopsis bahia	9.82 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

VIII. MICROBIOLOGICAL ANALYSIS

Not Applicable

IX. PHYSICAL PROPERTIES

1. Flash Point: 116 F
2. Pour Point: 7 F
3. Viscosity: 25 cst at 100 F, 34 cst at 60 F
4. Specific Gravity: 1.02 at 60 F, 1.01 at 100 F
5. pH: 6.14
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: Isopropanol, Water
8. Additives: None
9. Solubility: Not Applicable

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	0.2
Cadmium	<0.05
Chromium	1.0
Copper	<0.2
Lead	0.1
Mercury	0.003
Nickel	0.4
Zinc	0.15
Cyanide	<0.01
Chlorinated Hydrocarbons	<0.01

TECHNICAL PRODUCT BULLETIN #SW-2 (formerly #D-20)
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: JANUARY 7, 1985
REVISED LISTING DATE: AUGUST 21, 1995
"TOPSALL #30"
(a/k/a SUPERALL #38)

I. NAME, BRAND, OR TRADEMARK

Topsall #30

Type of Product: Surface Washing Agent (Oil and Petroleum Cleaning Agent)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

Stutton North Corporation

P.O. Box 724

Mandeville, LA 70448

Phone: (504) 626-3900

Fax: (504) 674-0476

(Mr. David Anton)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

Stutton North Corporation

P.O. Box 724

Mandeville, LA 70448

Phone: (504) 626-3900

Fax: (504) 674-0476

(Mr. David Anton)

Ecol-Chem, Inc.

777 South State Road 7, Suite 5T

Margate, FL 33068

Phone: (305) 956-3039

Fax: (305) 968-7320

(Mr. Sid Studin)

(for SUPERALL #38)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability:

TOPSALL #30 is non-flammable.

2. Ventilation:

Normal type household ventilation is adequate for handling and storage.

3. Skin and eye contact; protective clothing; treatment in case of contact:

In case of contact with eyes, wash thoroughly with large amounts of water. If irritation persists, seek medical attention.

Use protective gloves for manual cleaning.

4.a. Maximum storage temperature: 120°F

4.b. Minimum storage temperature: 20°F

4.c. Optimum storage temperature range: 40°F to 100°F

4.d. Temperatures of phase separations and chemical changes:

TOPSALL #30 has a pour point of 20°F and a boiling point of 212°F.

V. SHELF LIFE

TOPSALL #30 has a shelf life of not less than two years.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method:

For general use, apply by spray, mop, etc. Agitate severe spots and rinse thoroughly for a residue-free surface.

2. Concentration/Application Rate:

Dilute as noted below:

DILUTION TABLE

APPLICATION	TOPSALL #30	WATER
Normal cleaning*	1 part	up to 20
Heavy cleaning**	1 part	up to 15
Severe cleaning***	1 part	up to 5
Steam cleaning	1 part	up to 50
Pressure wash	1 part	up to 30

*Rigs and platforms, bilges, decks, waterline scum, shop machinery and equipment.

**Degasing tanks and barges, engine rooms and soot, oil stained concrete, petroleum based drilling muds.

***Black magic, Bunker C, crude oil, holding tanks, grease traps.

DO NOT USE UNDILUTED ON COMPOSITION FLOORS, WATER BASE PAINTED SURFACES, OR ALUMINUM.

3. Conditions for Use:

Recommended for cleaning petroleum fractions from decks, platforms, bilges, rigs, and other seagoing equipment, as noted above. TOPSALL #30 is not recommended for open-water oil dispersant use.

TOPSALL #30 is not recommended for general dispersant application.

VII. TOXICITY

Material tested	Species	LC50 (ppm)
TOPSALL #30	Menidia beryllina	156.60 96-hr
	Mysidopsis bahia	115.80 48-hr
No. 2 Fuel Oil	Menidia beryllina	6.40 96-hr
	Mysidopsis bahia	1.30 48-hr
TOPSALL #30 and	Menidia beryllina	4.60 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	5.00 48-hr
Reference Toxicant (DSS)	Menidia beryllina	1.60 96-hr
	Mysidopsis bahia	10.00 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

2. Effectiveness:

Not Applicable

VIII. MICROBIOLOGICAL ANALYSIS

Not Applicable

IX. PHYSICAL PROPERTIES

1. Flash Point: >212°F
2. Pour Point: 20°F
3. Viscosity: 30.53 SUS at 100°F
4. Specific Gravity: 1.06 at 70°F
5. pH: 12.6
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: None
8. Additives: CONFIDENTIAL
9. Solubility: Miscible with water

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	0.05
Cadmium	<0.002
Chromium	0.031
Copper	0.25
Iron	2.8
Lead	0.02
Mercury	<0.01
Nickel	<0.01
Zinc	0.25
Cyanide	<0.1
Polychlorinated Biphenyls	<0.1
Chlorinated Pesticides	<0.1

TECHNICAL PRODUCT BULLETIN #SW-9
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: MAY 25, 1989
REVISED LISTING DATE: APRIL 16, 1996
"CN-110"

I. NAME, BRAND, OR TRADEMARK

CN-110

Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER

Chemex, Inc.

107-B Balboa Drive

Broussard, LA 70518

Phone: (318) 837-9148

Fax: (318) 837-2648

(Mr. Gale Campbell)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

Chemex, Inc.

107-B Balboa Drive

Broussard, LA 70518

Phone: (318) 837-9148

Fax: (318) 837-2648

(Mr. Gale Campbell)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability:

Non-flammable

2. Ventilation:

None needed

3. Skin and eye contact; protective clothing; treatment in case of contact:

As in handling any industrial chemical, the standard precautions of wearing chemical-resistant gloves and eye protection are recommended.

4.a. Maximum storage temperature: 120F

4.b. Minimum storage temperature: -40F

4.c. Optimum storage temperature range : 70F-80F

4.d. Temperatures of phase separations and chemical changes:

Product does not lose effectiveness between temperatures of -40F through 120F, although it will become hazy if the temperature is sustained at less than 30F over a 24-hour period.

V. SHELF LIFE:

CN-110 has a shelf life of 2 years.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method:

There are no application restrictions. The preferred application method is by spraying and/or applying the product over the pollutant (primarily oil of any viscosity) on the stained area. Immediately, the product begins to work on breaking the physical bond between the oil and the object desired to be cleaned. The full effect of CN-110 on hard, porous and most non-porous materials usually takes a minimum of 30 minutes with a maximum retention time of 60 minutes. Then the freed oil is sprayed off with available water. The oil is then safely and effectively skimmed without dispersed oil remaining in the affected waters.

If "herding" or "corralling" a slick is desired, CN-110 can also be applied without the increased toxicities by dispersing minute particles of oil into the affected water stream.

2. Concentration/Application Rate:

Application concentration for cleaning shorelines is approximately 1 gallon per 75-100 square feet of affected area. Depending on depths of shorelines, this amount will give a residual of much less than 1 ppm of CN-110 in the affected waters. This residual should be lower than the toxicity of the spilled oil.

If "herding" is desired, the application concentration should be in its original state while either spraying CN-110 around the slick or dropping small amounts from a plane. The resulting residual concentration in this case should be the same as shoreline cleaning or less.

If it is desired that CN-110 be added to a high-pressure cleaning system or steam, the dilution rate should be no lower than 10%. This will lower the CN-110 residual in the affected waters to the parts per billion range.

3. Conditions for Use:

Preferrably fresh water, at temperature of 32F

VII.a. TOXICITY

MATERIAL TESTED	SPECIES	LC50 (ppm)
CN-110	Menidia beryllina	52,233.00 96-hr
	Mysidopsis bahia	12,262.00 48-hr
No. 2 Fuel Oil	Menidia beryllina	1.90 96-hr
	Mysidopsis bahia	0.9 48-hr
CN-110	Menidia beryllina	7.40 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	1.19 48-hr
Reference Toxicant (DSS)	Menidia beryllina	1.8 96-hr
	Mysidopsis bahia	5.9 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

b. EFFECTIVENESS

Not Applicable

VIII. MICROBIOLOGICAL ANALYSIS

Not Applicable

IX. PHYSICAL PROPERTIES

1. Flash Point: None
2. Pour Point: 30F
3. Viscosity: 45.7 cst at 78F
4. Specific Gravity: 1.025
5. pH: 11.4
6. Surface Active Agents:
Trace amounts of a sulfonated compound
7. Solvents: None
8. Additives: Complex silicate solution
9. Solubility: Not Applicable

X. ANALYSIS FOR HEAVY METALS, CYANIDES, AND CHLORINATED HYDROCARBONS

COMPOUND	CONCENTRATION (ppm)
Arsenic	<0.22
Cadmium	<0.088
Chromium	0.109/0.131*
Copper	0.238/0.234
Lead	<0.275
Mercury	<0.0001
Nickel	<0.11
Zinc	<0.374/<0.369*
Silver	<0.044
Cyanide	0.25
Chlorinated Hydrocarbons	None Detected

* Duplicate Analyses

TECHNICAL PRODUCT BULLETIN #SW-10 (formerly #D-38)
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: JULY 21, 1989
REVISED LISTING DATE: SEPTEMBER 27, 1995
"COREXIT 9580 SHORELINE CLEANER"

I. NAME, BRAND, OR TRADEMARK

COREXIT 9580 Shoreline Cleaner (EC9580A)

Type of Product: Surface Washing Agent (hydrocarbon based)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

Nalco/Exxon Energy Chemicals, LP

P.O. Box 87

Sugar Land, TX 77487-0087

Customer Services:

Phone: (281) 263-7205

(800) 333-3714

Fax: (281) 263-7149

24-hour Emergency Number:

(281) 263-7200

Product Management:

Phone: (281) 263-7736

(281) 263-7955

Mobile: (713) 854-1658

(Mr. Paul Hey)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

ABASCO

363 W. Canino Rd.

Houston, TX 77238-8573

Phone: (281) 931-4400

Nalco/Exxon Energy

Chemicals, L.P.

P.O. Box 87

Sugar Land, TX 77487-0087

Phone: (800) 333-3714

Nalco/Exxon Energy

Chemicals L.P.

P.O. Box 220

Long Beach, CA 90801

Phone: (310) 639-1553

Nalco/Exxon Energy

Chemical, L.P.

701 E. Tudor St, # 290

Anchorage, AK 99503

Phone: (907) 563-9866

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability:

IMO nonflammable; DOT combustible

COREXIT 9580 SHORELINE CLEANER

2. Ventilation:

Use with ventilation equal to unobstructed outdoors in moderate breeze.

3. Skin and eye contact; protective clothing; treatment in case of contact:

Avoid contact with eyes, skin and clothing. Wash skin with soap and water. Flush eyes with plenty of water until irritation subsides. Remove to fresh air.

4.a. Maximum storage temperature: 170 F

4.b. Minimum storage temperature: -30 F

4.c. Optimum storage temperature range: 40 F-100 F

4.d. Temperatures of phase separations and chemical changes: None

V. SHELF LIFE

The shelf life of unopened drums of COREXIT 9580 is unlimited.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method:

COREXIT 9580 contains a balanced formula of specifically selected biodegradable surfactants in a de-aromatized hydrocarbon solvent system. COREXIT 9580 has a very low degree of toxicity to marine and shoreline organisms.

Shorelines, Mangroves, and Seagrasses-COREXIT 9580 is sprayed directly on the oiled rocky shorelines, mangroves or seagrasses full strength as supplied. After a soak time of zero to thirty minutes, rinse the cleaner and the oil released from the shoreline surface into the water where it can be readily recovered by conventional means such as skimmers or absorbents. The soak time may vary with temperature, oil density and degree of weathering.

2. Concentration/Application Rate:

The recommended dosage is approximately 1 gallon per 100 sq. ft. but this can vary depending on the amount of weathering and oiling. The product should be applied full strength as supplied. Since it is hydrocarbon-based, the product should not be diluted with water during application as this will greatly reduce effectiveness.

3. Conditions for Use:

COREXIT 9580 SHORELINE CLEANER is useful on shorelines in fresh or salt water. It is effective on all types of oil including heavily weathered and emulsified oil ("chocolate mousse") containing up to 50% water.

VII. TOXICITY AND EFFECTIVENESS

1. Toxicity:

MATERIAL TESTED	SPECIES	LC50 (ppm)
COREXIT 9580	Menidia beryllina	86.88 96-hr
	Mysidopsis bahia	31.96 48-hr
No. 2 Fuel Oil	Menidia beryllina	10.72 96-hr
	Mysidopsis bahia	16.12 48-hr
COREXIT 9580 & No.2 Fuel Oil (1:10)	Menidia beryllina	13.20 96-hr
	Mysidopsis bahia	9.06 48-hr
Reference Toxicant	Menidia beryllina	7.02 96-hr

COREXIT 9580 SHORELINE CLEANER

(DSS)

Mysidopsis bahia

9.82 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

VIII. MICROBIOLOGICAL ANALYSIS

Not Applicable

IX. PHYSICAL PROPERTIES

1. Flash Point: 174 F
2. Pour Point: -65 F
3. Viscosity: 3.1 cp at 100 F, 1.7 cp at 150 F
4. Specific Gravity: 0.810 at 60 F
5. pH: Not Applicable
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: Dearomatized Hydrocarbon
8. Additives: None
9. Solubility: Not Applicable

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

COMPOUND	CONCENTRATION (ppm)
Arsenic	<0.06
Cadmium	<0.002
Chromium	0.003
Copper	<0.001
Iron	0.046
Lead	<0.009
Mercury	<0.0002
Nickel	0.01
Zinc	0.041
Cyanide	<0.05
Chlorinated Hydrocarbons	3.1 ug/ul

COREXIT 9580 SHORELINE CLEANER

TECHNICAL PRODUCT BULLETIN #SW-12 (formerly D-41)
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: AUGUST 11, 1989
REVISED LISTING DATE: NOVEMBER 2, 1995
"PREMIER 99"

I. NAME, BRAND, OR TRADEMARK

PREMIER 99

Type of Product: Surface Washing Agent (Water Based)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

Gold Coast Chemical Products

2790 South Park Road

Pembroke Park, FL 33009

Phone: (954) 893-0044

Fax: (954) 893-8884

(Mr. Eli Finkelberg)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

Gold Coast Chemical Products

2790 South Park Road

Pembroke Park, FL 33009

Phone: (954) 893-0044

Fax: (954) 893-8884

(Mr. Eli Finkelberg)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability:

None

2. Ventilation:

Adequate ventilation is needed if in closed environment.

3. Skin and eye contact; protective clothing; treatment in case of contact:

Skin and eye contact: Detergents will defat skin and eyes. May cause irritation.

Protective clothing: Use protective gloves for manual cleaning and splash goggles.

Treatment in case of contact: If splashed on skin, wash with copious amounts of water. If ingested, drink diluted vinegar or lemon juice. Get medical attention.

4.a. Maximum storage temperature: 125 F

4.b. Minimum storage temperature: 0 F

4.c. Optimum storage temperature range: 0 F - 75 F

Avoid freezing the product. If material freezes and separation is experienced, it should be warmed and mixed together.

4.d. Temperatures of phase separations and chemical changes:

No separation expected down to 20 F

V. SHELF LIFE

Unopened material - at least 5 years is expected.

Opened material - at least 2 years is expected.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method:

Apply by spray, mop, or pressure washer, etc. Agitate severe spots. Rinse thoroughly for residue free surface.

2. Concentration/Application Rate:

DILUTION TABLE

Application	PREMIER 99	Water
Normal Cleaning	1 Part	up to 20
Heavy Cleaning	1 Part	up to 15
Severe Cleaning	1 Part	up to 5
Steam Cleaning	1 Part	up to 50
Pressure Wash	1 Part	up to 30

3. Conditions for Use:

Water salinity, water temperature, types and ages of pollutants are not determined.

VII. TOXICITY

MATERIAL TESTED	SPECIES	LC50 (ppm)
PREMIER 99	Menidia beryllina	565.7 96-hr
	Mysidopsis bahia	94.7 48-hr
No. 2 Fuel Oil	Menidia beryllina	10.2 96-hr
	Mysidopsis bahia	2.1 48-hr
PREMIER 99 & No. 2 Fuel Oil (1:10)	Menidia beryllina	8.2 96-hr
	Mysidopsis bahia	2.5 48-hr
Reference Toxicant (DSS)	Menidia beryllina	1.55 96-hr
	Mysidopsis bahia	7.96 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

VIII. MICROBIOLOGICAL ANALYSIS

Not Applicable

IX. PHYSICAL PROPERTIES

1. Flash Point: 160 F
2. Pour Point: Not Applicable
3. Viscosity: 15 cps
4. Specific Gravity: 1.01

5. pH: 10 - 11.5

6. Surface Active Agents: Active 8000* - Purity Chemical <10%

7. Solvents: <5%

8. Additives: <5%

9. Solubility: Complete in Water

*Note: Particular chemical composition of Active 8000 is considered by Purity Chemical as a trade secret. More detailed information can be given by Purity Chemical - Mr. Jim Palmer, 1800 NW 70th Ave., Miami, FL 33126, 1-800-654-0235, FAX (305) 592-2601.

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

COMPOUND	CONCENTRATION (ppm)
Arsenic	< 0.01
Cadmium	< 0.0005
Chromium	< 0.1
Copper	< 0.1
Lead	< 0.005
Mercury	< 0.001
Nickel	< 0.5
Zinc	< 0.1
Cyanide	< 0.005

TECHNICAL PRODUCT BULLETIN #SW-15 (formerly D-46)
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: APRIL 23, 1990
REVISED LISTING DATE: AUGUST 30, 1995
"SIMPLE GREEN"

I. NAME, BRAND, OR TRADEMARK

SIMPLE GREEN

Type of Product: Surface Washing Agent (Water Based)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

Sunshine Makers, Inc.

15922 Pacific Coast Highway

Huntington Harbor, CA 92649

Phone: (800) 228-0709 / (562) 795-6000

Fax: (310) 562-3034

(Mr. Bruce P. FaBrizio)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

Sunshine Makers, Inc.

15922 Pacific Highway

Huntington Harbor, CA 92649

Phone: (800) 228-0709 / (310) 795-6000

Fax: (310) 592-3034

(Mr. Milton Krause)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability:

Non-flammable

2. Ventilation:

Not required

3. Skin and eye contact; protective clothing; treatment in case of contact:

SIMPLE GREEN is safe for use on skin and will not cause irritation in the majority of users.

Avoid contact with eyes, irritation may result. Wear splash goggles or full face-shield and have eye washing equipment available in areas where potential is high for eye contact.

No special precautions or additional protective equipment are required during handling or use.

SIMPLE GREEN is provided with a Material Safety Data Sheet (No. 1002).

4.a. Maximum storage temperature: 140 F

4.b. Minimum storage temperature: 34 F

4.c. Optimum storage temperature range: >32 F and <140 F

4.d. Temperatures of phase separations and chemical changes:

SIMPLE GREEN is stable and phase separation will not occur at temperatures within the above

SIMPLE GREEN

storage range.

V. SHELF LIFE

SIMPLE GREEN has an unlimited shelf life.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method:

Spray on oily surface.

2. Concentration/Application Rate:

For open water, spray concentrated product directly on surface of oil at a ratio of 4 parts of oil to 1 part of SIMPLE GREEN®. Site conditions may warrant alternative procedures to maintain effectiveness.

3. Conditions for Use:

Equally effective in fresh water, estuarine, and marine environments at all temperatures.

SIMPLE GREEN® contains no known EPA Priority Pollutants.

VII. TOXICITY

MATERIAL TESTED	SPECIES	LC50 (ppm)
SIMPLE GREEN	Menidia beryllina	27.90 96-hr
	Mysidopsis bahia	77.60 48-hr
No. 2 Fuel Oil	Menidia beryllina	6.50 96-hr
	Mysidopsis bahia	3.70 48-hr
SIMPLE GREEN & No. 2 Fuel Oil (1:10)	Menidia beryllina	8.30 96-hr
	Mysidopsis bahia	4.40 48-hr
Reference Toxicant (DSS)	Menidia beryllina	7.80 96-hr
	Mysidopsis bahia	21.20 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

VIII. MICROBIOLOGICAL ANALYSIS

SIMPLE GREEN contains no microorganisms, enzymes, or biological material.

IX. PHYSICAL PROPERTIES

1. Flash Point: >200 F
2. Pour Point: None
3. Viscosity: 2.0 Centistokes at 78 F
4. Specific Gravity: 1.0257 g/ml at 72 F
5. pH: 9.5
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: CONFIDENTIAL
8. Additives: CONFIDENTIAL
9. Solubility: Infinitely miscible.

(Increasing salt concentrations in marine ecosystems will lead to complexes with SIMPLE GREEN that may become visible at rations above one part SIMPLE GREEN to 99 parts seawater.)

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

COMPOUND	CONCENTRATION (ppm)
Aluminum	10.0000
Arsenic	<5.0000
Cadmium	<0.0233
Chromium	0.1150
Copper	<0.7500
Lead	0.0776
Mercury	<0.0125
Nickel	<2.3000
Selenium	<1.0000
Zinc	<4.4000
Cyanide	<1.0000
Chlorinated Hydrocarbons	<1.0

TECHNICAL PRODUCT BULLETIN #SW-16 (formerly D-52)

USEPA, OIL PROGRAM CENTER

ORIGINAL LISTING DATE: JULY 8, 1991

REVISED LISTING DATE: JUNE 14, 1995

"AQUACLEAN"

I. NAME, BRAND, OR TRADEMARK

AQUACLEAN

Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

Madison Chemical Company, Inc.

P. O. Box 1599

Madison, IN 47250-0599

Phone: (812) 273-6000

Fax: (812) 273-6002

(Mr. Sam George)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

Madison Chemical Company, Inc.

P. O. Box 1599

Madison, IN 47250-0599

Phone: (812) 273-6000

Fax: (812) 273-6002

(Mr. Sam George)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability:

Non-flammable

2. Ventilation:

Handle in a well ventilated space. Local exhaust is recommended if TLV's are exceeded.

3. Skin and eye contact; protective clothing; treatment in case of contact:

Avoid eye and skin contact. In case of such contact, immediately flush with large amount of cool water for at least 15 minutes, and call a physician.

Wear protective eye goggles, impermeable protective gloves, and protective clothing when handling the product. Wash contaminated protective equipment (including clothings, shoes, eye goggles, gloves, etc.) thoroughly in soap and water, rinse repeatedly in clean water and dry before reuse.

Avoid ingestion, breathing dusts, mists, or fumes. In case of ingestion, induce vomiting, give water and call a physician. In case of inhalation, move the affected person to fresh air, and call a physician.

AQUACLEAN

- 4.a. Maximum storage temperature: 140 F
- 4.b. Minimum storage temperature: 50 F
- 4.c. Optimum storage temperature range: >50 F to <104 F
- 4.d. Temperatures of phase separations and chemical changes:<50 F,>104F

V. SHELF LIFE

18 months if stored between 50 F and 104 F, and away from acids.

VI. RECOMMENDED APPLICATION PROCEDURES

1. Application Method:

AQUACLEAN may be introduced with a pressure spray to cover the affected area, after the appropriate dilution or concentration is prepared. After application, agitate spill area with water using a solid stream flow.

For manual cleaning with AQUACLEAN, follow instructions in the product data sheet provided by the manufacturer.

2. Concentration/Application Rate:

For small spills, dilute 3 to 1 with water and apply as above.

For large spills, prepare a 33% solution of AQUACLEAN and apply through a foam eductor at 6% setting with approximately 90 gallons per minute flow at the nozzle.

For spills on shorelines and beaches, dilute AQUACLEAN 50% with fresh water and apply using a pressure spray to cover the entire contaminated area. Then rinse with fresh water.

3. Conditions for Use:

Water temperature should be above 41 F.

VII. TOXICITY

Material tested	Species	LC50 (ppm)
AQUACLEAN	Menidia beryllina	70.7 96-hr
	Mysidopsis bahia	32.7 48-hr
No. 2 Fuel Oil	Menidia beryllina	4.4 96-hr
	Mysidopsis bahia	1.8 48-hr
AQUACLEAN and No. 2 Fuel (1:10)	Menidia beryllina	6.5 96-hr
	Mysidopsis bahia	2.1 48-hr
Reference Toxicant (DSS)	Menidia beryllina	1.4 96-hr
	Mysidopsis bahia	4.9 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

VIII. PHYSICAL PROPERTIES AND COMPONENTS

- 1. Flash Point: None detected
- 2. Pour Point: -20 F
- 3. Viscosity: 16.5 cP at 25 C (77 F)

AQUACLEAN

4. Specific Gravity: 1.06 at 25 C (77 F)
5. pH: 11.8 (at full strength)
6. Chemical Name and Percentage by Weight of the Total Formulation: CONFIDENTIAL
7. Surface Active Agents: Anionic and nonionic synthetic surfactants.
8. Solvents: CONFIDENTIAL
9. Additives: CONFIDENTIAL
10. Solubility: Completely soluble

IX. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	1.10
Cadmium	0.16
Chromium	0.20
Copper	0.66
Lead	1.83
Mercury	<0.01
Nickel	0.80
Zinc	0.29
Cyanide	0.06
Chlorinated hydrocarbons (by total organic halides analysis)	4.20

TECHNICAL PRODUCT BULLETIN #SW-17 (formerly D-14)
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: SEPTEMBER 30, 1984
REVISED LISTING DATE: JULY 25, 1996
"PETRO-GREEN ADP-7"

I. NAME, BRAND, OR TRADEMARK

PETRO-GREEN ADP-7

Type of Product: Surface Washing Agent (Water Based Concentrate)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER

Petro-Green, Inc.

P.O. Box 814665

Dallas, TX 75381

Phone/Fax: (972) 484-7336

(Mr. Arnold Paddock)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

Petro-Green, Inc.

P.O. Box 814665

Dallas, TX 75381

Phone/Fax: (972) 484-7336

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability:

Non-flammable.

2. Ventilation:

Use normal household type ventilation when storing and handling.

3. Skin and eye contact; protective clothing; treatment in case of contact:

Avoid contact with skin and eyes. In the event of contact, flush with clean water. Prolonged contact with skin can cause drying. Treat skin with common hand lotion. The use of gloves and goggles is recommended.

4.a. Maximum storage temperature: 140 F

4.b. Minimum storage temperature: 26 F

4.c. Optimum storage temperature: 40 F to 110 F

4.d. Temperatures of phase separations and chemical changes:

No phase separations or chemical changes within storage temperature range.

V. SHELF LIFE

PETRO-GREEN ADP-7 has an indefinite shelf life.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method:

For spills on soils, sandy or rocky areas: The ADP-7 can be pre-mixed into water, or educted into a water flow, to be sprayed directly onto the oil spill.

2. Concentration/Application Rate:

For spills on land: Typical dilution is one gallon of ADP-7 diluted in one barrel (42 gallons) of water (about 2.4%), which is enough to wash one barrel of oil on the surface. After loose oil is vacuumed off soil surfaces, the application rate is 100 barrels of solution per acre.

3. Conditions for Use:

The conditions for each spill dictate proper choice of surface washing agent. PETRO-GREEN ADP-7 has been tested in both tropical and arctic environments, as well as with fresh water and a variety of produced water salinities. It has been found to be effective over these ranges.

PETRO-GREEN ADP-7 has also been tested on a wide variety of fresh crude oil and product spills. There are no specific limitations to use, however, and an aged spill is likely to be non-responsive as it would be to any environmentally sound surface washing agent. For aged or asphaltic spills, the solution may be heated to 150 F in a hot water washing rig, or a common oil field "hot oiler" truck to increase effectiveness.

VII. TOXICITY

MATERIAL TESTED	SPECIES	LC50 (ppm)
PETRO-GREEN ADP-7	Menidia beryllina	11.61 96-hr
	Mysidopsis bahia	10.56 48-hr
No. 2 Fuel Oil	Menidia beryllina	19.00 96-hr
	Mysidopsis bahia	1.51 48-hr
PETRO-GREEN ADP-7	Menidia beryllina	10.95 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	1.12 48-hr
Reference Toxicant (DSS)	Menidia beryllina	1.5 96-hr
	Mysidopsis bahia	7.6 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

VIII. MICROBIOLOGICAL ANALYSIS

Not Applicable

IX. PHYSICAL PROPERTIES

1. Flash Point: >212 F
2. Pour Point: 22 F
3. Viscosity: 103.1 at 60 F
4. Specific Gravity: 1.035 at 60 F
5. pH: 10.5
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: CONFIDENTIAL

8. Additives: CONFIDENTIAL

9. Solubility: Not Applicable

X. ANALYSIS FOR HEAVY METALS AND CHLORINATED HYDROCARBONS

COMPOUND	CONCENTRATION (ppm)
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Arsenic	not detected to 1 ppb
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Cadmium	0.12
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Chromium	not detected to 10 ppb
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Copper	0.4
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Iron	1.09
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Lead	0.6
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Mercury	0.004
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Nickel	0.75
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Zinc	1.32
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Cyanide	0.074
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Chlorinated Pesticides	<1.0*
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*Surfactant activity interfered with the extraction and chemical analyses; this was the practical limit of detection.

TECHNICAL PRODUCT BULLETIN #SW-18
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: October 23, 1996
"NATURE'S WAY HS"
(a/k/a NATURE'S WAY PC, VERSACLEAN, **POWERCLEAN**)

I. NAME, BRAND, OR TRADEMARK
NATURE'S WAY HS
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER
Integra Environmental, Ltd.
5825 Centralcrest
Houston, TX 77092
Phone: (713) 680-1234
Fax: (713) 680-1608

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

Earth Friendly Products 206 W. Avenue B Killeen, TX 76541 Phone: (254) 526-4161	Atec Trans-Tool 110 Connelly San Antonio, TX 78203 Phone: (800) 531-9978
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Kaiser Industries
5380 W 34th PMB 230
Houston, TX 77092-6626
Phone: (713) 290-8122

J.A.M. Distributing
Box 590026
Houston, TX 77259
Phone: (713) 844-7750

Coleman Pacific Environmental Service
389 Mamaki St.
Honolulu, HA 96821
Phone: (808) 373-1688

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability:

Non-flammable.

2. Ventilation:

No special precautions are required, but in case of inhalation, move person to fresh air.

3. Skin and eye contact; protective clothing; treatment in case of contact:

Flush contaminated skin with plenty of water for at least 15 minutes. Consult a physician if irritation develops. Protective gloves are recommended for extended or prolonged contact, (e.g., immersing hands). Tight fitting safety goggles are recommended for handling product in

NATURE'S WAY HS

concentrated form, especially if contacts are worn.

4.a. Maximum storage temperature: 130°F

4.b. Minimum storage temperature: 32°F

4.c. Optimum storage temperature: 90°F

4.d. Temperatures of phase separations and chemical changes: Not applicable.

V. SHELF LIFE

NATURE'S WAY HS has a five year shelf life.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method:

NATURE'S WAY HS may be applied by spraying, pouring, dispensing equipment, or by manual or automatic scrubber machines. Do not mix the product with any other cleaner nor allow any other cleaners to contact surfaces where HS is being used. Hot water should never be used.

2. Concentration/Application Rate:

Apply NATURE'S WAY HS full strength (undiluted) to surface area with sprayer, concentrating on areas with heaviest contamination first. To speed clean-up of shorelines and beaches, pressure spray into cracks and crevices prior to scrubbing. Agitate and scrub well using power brushes, hand brushes, brooms or mops. If possible, allow the scrubbed solution to remain on the surface for at least 15 minutes. If allowed to soak overnight, the next morning the treated surface must be re-wet with water, reagitated, and rinsed. Additional product will not be necessary at that time.

3. Conditions for Use:

For heavily contaminated surfaces, NATURE'S WAY HS should always be used full strength. For moderate accumulations HS may be diluted to as little as 2 oz. per gallon of cool water for cleaning light contamination. For average contamination, a dilution of 12 oz. per gallon is recommended (1 part NATURE'S WAY HS to 10 parts water). For light use, 4 to 6 oz. of product per gallon water will be sufficient.

VII. TOXICITY

MATERIAL TESTED	SPECIES	LC50 (ppm)
NATURE'S WAY HS	Menidia beryllina	152.14 96-hr
	Mysidopsis bahia	193.00 48-hr
No. 2 Fuel Oil	Menidia beryllina	3.15 96-hr
	Mysidopsis bahia	0.96 48-hr
NATURE'S WAY HS	Menidia beryllina	3.91 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	1.07 48-hr
Reference Toxicant (DSS)	Menidia beryllina	- 96-hr
	Mysidopsis bahia	5.71 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

NATURE'S WAY HS

VIII. MICROBIOLOGICAL ANALYSIS

Not Applicable

IX. PHYSICAL PROPERTIES

1. Flash Point: N/A
2. Pour Point: Flowable at all temperatures above freezing
3. Viscosity: <100 CPS
4. Specific Gravity: 1.01
5. pH: 8 - 9.5
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: CONFIDENTIAL
8. Additives: CONFIDENTIAL
9. Solubility: Not Applicable

X. ANALYSIS FOR HEAVY METALS AND CHLORINATED HYDROCARBONS

COMPOUND	CONCENTRATION
Arsenic	<0.003 mg/L
Cadmium	<0.005 mg/L
Chromium	<0.010 mg/L
Copper	0.020 mg/L
Iron	Not reported
Lead	<0.002 mg/L
Mercury	<0.0002 mg/L
Nickel	<0.030 mg/L
Zinc	0.260 mg/L
Cyanide	<0.020 mg/L
Chlorinated Hydrocarbons	<1,000 µg/L

TECHNICAL PRODUCT BULLETIN #SW-19
US EPA, OIL PROGRAM CENTER
LISTING DATE: January 30, 1997
"CYTOSOL"

I. NAME, BRAND, OR TRADEMARK

CYTOSOL

Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER

CytoCulture International, Inc.

249 Tewksbury Avenue

Point Richmond, CA 94801-3829

Phone: (510) 233-0102

Fax: (510) 233-3777

(Dr. Randall von Wedel)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

CytoCulture International, Inc.

249 Tewksbury Avenue

Point Richmond, CA 94801-3829

Phone: (510) 233-0102

Fax: (510) 233-3777

(Mr. Greg McGowan)

Foss Environmental, Inc.

7440 West Marginal

Seattle, WA 98108-4141

Phone: (206) 768-1450

Fax: (206) 767-3460

(Mr. Larry Pintler)

Advanced Cleanup Tech. Inc

20928 Lamberton Ave.

Carson, CA 90810

Phone: (800) 334-2284

Fax: (310) 763-9076

(Mr. Walt Dorn)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability:

Non-flammable. However, keep the product away from heat and avoid contact with strong oxidizing agents. Ensure proper disposal of product-saturated absorbants, rags, and combustible materials to avoid the possibility of spontaneous combustion.

2. Ventilation:

Product is not volatile. However, in the event of aerosol inhalation, immediately move victim to fresh air. If victim has stopped breathing, give artificial respiration, preferably by mouth to mouth. Get medical attention immediately.

3. Skin and eye contact; protective clothing; treatment in case of contact:

CYTOSOL

The CytoSol contains no volatile hydrocarbons or petroleum constituents. However, as a precautionary measure, wear gloves and safety glasses meeting the specifications of ANSI Standard Z87.1. Avoid breathing aerosols. Avoid prolonged contact with skin.

4.a. Maximum storage temperature: 110 F

4.b. Minimum storage temperature: 39 F

4.c. Optimum storage temperature: 55 F

4.d. Temperatures of phase separations and chemical changes:

Avoid freezing. At temperatures below the cloud point (43 F), the product may become cloudy, but will return to normal upon warming, with no effect on performance. Store product in airtight containers, if possible, without excessive exposure to moisture.

V. SHELF LIFE: Closed container: 10 years in a dry environment.

Open container: 1 year in a warm, humid environment.

The product does not deteriorate appreciably over time, but will grow bacteria if water condensation accumulates in the container.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method:

The CytoSol is applied to oiled shorelines to extract and recover weathered petroleum by flotation with passive water deluges from header pipes or manual spraying. Remaining residual hydrocarbons are biodegraded, either passively by intrinsic bioremediation, or aggressively by enhancing the process with controlled amounts of nutrients and/or acclimated cultures of bacteria cultured from the site, when approved by local, state and federal agencies.

The CytoSol Process is most suitable for the treatment of heavily oiled shorelines that do not respond well to conventional treatments, or that are considered too sensitive for mechanical/pressure wash strategies. Prior to the application of CytoSol, collection booms, oil skimmers, sorbent pads, or other appropriate containment and collection mechanisms must be deployed and operational.

2. Concentration/Application Rate:

CytoSol may be applied with a variety of spraying or washing equipment, depending upon the scale and type of shoreline to be cleaned. The product is to be used only neat and undiluted, for direct application to spilled oil. For large beach areas, CytoSol can be sprayed from water trucks or work boats equipped with pumps, hoses, and nozzles to deliver the product as an aerial spray. In smaller applications, CytoSol may be applied with hand sprayers or portable pumps to spray the product directly onto oiled surfaces. Dose rates will vary with the type and amount of petroleum spilled, the extent of weathering, and other site specific conditions, including temperature, porosity of shoreline, and residence time available to let the product contact the oil. In general, the ratio of applied CytoSol to crude oil is between 0.5:1 and 1:1. The quantity of CytoSol applied should be approximately equivalent to the quantity of petroleum accumulated on the shoreline, or as required to dissolve and remove weathered oil. After application, the product should be allowed to penetrate and dissolve the weathered petroleum for at least one hour, preferably longer. Cold weather applications will require more contact time before initiating recovery. In tidal areas, it is advisable to apply the CytoSol as the tide is ebbing (receding) to maximize contact time. Trapped oil may

continue to be released for several days, requiring that containment devices be left in place.

3. Conditions for Use:

The following shoreline types are appropriate for the use of CytoSol: Coarse sand beaches where petroleum has penetrated into sand; marsh areas and vegetated wetlands where oil has coated plants and become trapped; concrete bulkheads, rip rap and piers that may have trapped oil; oiled pilings; gravel or cobble shorelines and rocky shores, where oil has become trapped in pockets; and, public beaches, fisheries, hatcheries, river banks, and other sensitive or high impact sites. The CytoSol has been fielded tested successfully for removing oil from mussel beds and intertidal zones, pilings and concrete rip rap. The CytoSol also proved effective in facilitating the removal of oil from the banks and vegetation along an oiled creek.

VII. TOXICITY

MATERIAL TESTED	SPECIES	LC50 (ppm)
CytoSol	Menidia beryllina	738 96-hr
	Mysidopsis bahia	124 48-hr
No. 2 Fuel Oil	Menidia beryllina	38.9 96-hr
	Mysidopsis bahia	5.9 48-hr
CytoSol	Menidia beryllina	24.3 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	7.0 48-hr
Reference Toxicant (DSS)	Menidia beryllina	13.8 96-hr
	Mysidopsis bahia	22.2 48-hr

NOTE: This toxicity data was derived with the EPA protocols for dispersants using a blender to emulsify the product into the water for testing organisms. The CytoSol emulsion created microdroplets of product which may have had direct physical effects on the test larvae. Since the solubility of the product in water is so low (14 ppm or less), it is probable that the observed effects on the test organisms was caused by larvae having direct contact with droplets of product rather than by a true chemical toxicity from the trace amount of dissolved product. In practice, the CytoSol would not be emulsified to any great extent during application. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

VIII. MICROBIOLOGICAL ANALYSIS

Not Applicable

IX. PHYSICAL PROPERTIES

1. Flash Point: 360 F
2. Pour Point: 10 F
3. Viscosity: 4.15 CST @ 104 F
4. Specific Gravity: 0.8877 @ 60 F
5. pH: Neutral
6. Surface Active Agents: None
7. Solvents: No Petroleum Distillates

CYTOSOL

8. Additives: CONFIDENTIAL

9. Solubility: 14 ppm in fresh water, 7 ppm in sea water

X. ANALYSIS FOR HEAVY METALS AND CHLORINATED HYDROCARBONS

COMPOUND	CONCENTRATION
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Arsenic	ND
Cadmium	ND
Chromium	ND
Copper	ND
Iron	ND
Mercury	ND
Nickel	ND
Zinc	ND
Cyanide	ND
Chlorinated Hydrocarbons	ND

CYTOSOL

TECHNICAL PRODUCT BULLETIN #SW-20
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: March 21, 1997
"BIOSOLVE®"

I. NAME, BRAND, OR TRADEMARK

BIOSOLVE® Hydrocarbon Mitigation Agent
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER

The Westford Chemical Corporation®
P.O. Box 798
Westford, MA 01886
Phone: (978) 392-0689 or (800) 225-3909 or (508) 885-1113
Fax: (978) 692-3487
(Mr. Ron LaRoche or Mr. Stephen LaRoche)
Web Site: <http://www.biosolve.com>
Email: Info@BioSolve.com

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

Western States BioSolve®	Southwest Environmental
17151 Newhope St. Suite 201	3545 NW 58th, Suite 750
Fountain Valley, CA 92708	Oklahoma City, OK 73112
Phone: (714) 438-2221	Phone: (405) 946-7800
Fax: (714) 438-2217	Fax: (405) 947-4680

Midlantic Environmental	Great Lakes BioSolve®
Enterprises, Inc.	3432 W. Vollmer Rd., Suite 106
11 Lindsey Court	Olympia Fields, IL 60461
Wappingers Falls, NY 12590	Phone: (708) 481-9387
Phone: (914) 227-4177	(800) 619-6074
(800) 477-2461	Fax: (708) 481-9387
Fax: (914) 227-4033	(Mr. Jeff Rodgers)

BioSolve® of Canada, Ltd.
499 Canterbury Dr. SW
Calgary, Alberta, Canada T2W 1J4
Phone: (403) 238-2477
(800) 282-3254
Fax: (403) 238-5822

BIOSOLVE

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability:

Non-flammable

2. Ventilation:

Normal

3. Skin and eye contact; protective clothing; treatment in case of contact:

Flush contaminated eyes thoroughly with water for 15 minutes, and get medical attention.

Remove contaminated clothing, wash exposed area with soap and water, wash clothing before reuse. Get medical attention if irritation develops. Get medical attention for ingestion. No medical attention is necessary with inhalation. There are no special storage requirements or special handling precautions; use good normal hygiene.

4.a. Maximum storage temperature: 120 F (50 C)

4.b. Minimum storage temperature: 35 F (1.5 C)

4.c. Optimum storage temperature: 60 F (15 C)

4.d. Temperatures of phase separations and chemical changes: Not applicable.

V. SHELF LIFE

BioSolve® has a 10+ year shelf life if unopened.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method:

Dilute or use eductors to specified rate and apply through fire hose, power washers, steam powered units, or chemical boom sprayers with nozzles that produce a shearing action. Special nozzles to apply the solution as droplets are not necessary. For shoreline cleanup involving heavy or weathered crude, presoak to a 6% solution may be necessary.

2. Concentration/Application Rate:

BioSolve® is a highly concentrated product and must be diluted with water before use. Dilution ratios vary depending on site specific conditions. Dilution ratio's normally run at 6%, 3%, or 1%. For heavy, mousse, or weathered oil, a 3% to 6% solution should be applied. For light or refined products, apply at 2% to 3%. For sheens, apply at .5 to 1%. Since testing shows that BioSolve® quickly emulsifies weathered crude, it is not critical to apply immediately after a spill occurs; impact considerations can be fully considered prior to action taken.

Surface Washing Applications: BioSolve® applied through power washers in light dilution is very effective in attaining the removal of oils from rock, cobblestone, shorelines, and sea walls. In marsh or wetland applications, BioSolve® prevents the oil from clinging to grasses and mangroves.

Rigs and Platforms: BioSolve® is used to inert undersea pipelines before plugging and abandonment, degas tanks and platforms during workover operations, and to wash drill cuttings to remove oils and prevent sheens on surface waters.

3. Conditions for Use:

May be used with salt or fresh water. Temperature is not relevant.

BIOSOLVE

VII. TOXICITY

MATERIAL TESTED	SPECIES	LC50 (ppm)
BIOSOLVE®	Menidia beryllina	6.4
	Mysidopsis bahia	3.6
No. 2 Fuel Oil	Menidia beryllina	5.6
	Mysidopsis bahia	2.7
BIOSOLVE® & No. 2 Fuel Oil (1:10)	Menidia beryllina	7.4
	Mysidopsis bahia	1.3
Reference Toxicant (SDS)	Menidia beryllina	7.2
	Mysidopsis bahia	13.4

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

VIII. MICROBIOLOGICAL ANALYSIS

Not Applicable. BioSolve® contains no microbes or enzymes.

IX. PHYSICAL PROPERTIES

(Liquid concentrate)

1. Flash Point: N/A, Water based >200 F or 93.3 C
2. Pour Point: 32.9 F or 0.5 C
3. Viscosity: 77.5 Centistokes (concentrate), 490 centipoise (concentrate), 15 centipoise at 6%, at 60.08 F or 15.6 C
4. Specific Gravity: 1.025 at 60 F or 15.5 C
5. pH: 9.37 +/- .5
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: CONFIDENTIAL
8. Additives: CONFIDENTIAL
9. Solubility: Complete-true solution formed with water

X. ANALYSIS FOR HEAVY METALS AND CHLORINATED HYDROCARBONS

COMPOUND	CONCENTRATION (ppm)
Arsenic	ND<0.2
Cadmium	ND<0.18
Chromium	ND<0.5
Copper	ND<0.6
Lead	ND<0.2
Mercury	ND<0.07
Nickel	ND<0.6
Silver	ND<0.4
Zinc	0.51
Cyanide	ND<0.01

BIOSOLVE

Chlorinated Hydrocarbons

ND<0.5

TECHNICAL PRODUCT BULLETIN #SW-21
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: March 2, 1998
PETROTECH 25

I. NAME, BRAND, OR TRADEMARK
PETROTECH 25
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER
Petrotech America Corp.
675 Massachusetts Ave.
Cambridge, MA 02139
(617) 491-6660
(617) 491-6661 (fax)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

Petrotech America Corp.	Manufacturing Plant:
675 Massachusetts Ave.	Clariant Corp.
Cambridge, MA 02139	Charlotte, NC
(617) 491-6660	
(617) 491-6661 (fax)	

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability:

Non-flammable.

2. Ventilation:

Normal.

3. Skin and eye contact; protective clothing; treatment in case of contact:

No special handling is required beyond that prescribed under the general OSHA rules for non-hazardous, non-flammable and noncorrosive liquids. This is not to suggest that contact with eyes and skin is totally without risk for allergy. Contact with eyes and skin is to be avoided, as suggested under OSHA procedures.

4.a. Maximum storage temperature: +45 C

4.b. Minimum storage temperature: -5 C (can be stored below its freezing point without detectable loss of performance provided that it is warmed to within liquid range prior to application.)

4.c. Optimum storage temperature: >-5C and <+45C

4.d. Temperatures of phase separations and chemical changes:

Not applicable.

V. SHELF LIFE

Petrotech 25 has an unlimited shelf-life when maintained in the factory sealed containers and stored

PETROTECH 25

within the prescribed temperature limits. Climatic factors such as humidity have no effect on closed container storage although the product is hygroscopic and will absorb water if left for long periods in open containers.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method

It is recommended that the surface washing agent Petrotech 25 be applied to contaminated surfaces in one of three ways: (a) a mixture of ten parts Petrotech 25 to ninety parts water, either fresh or saltwater, should be discharged over the surface by commercial pressure washer, hot or cold; (b) the same mixture discharged on the surface using standard fire fighting apparatus preferably at a nozzle pressure of 100 PSI plus; or (3) Petrotech 25 in concentrated form can be applied to the surface and manually or mechanically brushed and then water applied.

2. Concentration/Application Rate:

Generally, Petrotech 25 is applied neat in its factory supplied concentrate form. However, for lighter oils where educting or proportioning equipment is available, an aqueous solution of Petrotech 25 between 3 and 10 percent may be used. Broadly speaking, Petrotech 25 has no solvent action. For any given oil spill of a specific nature, the application rate is unaffected by neat or diluted application as long as the concentrate to oil ratio remains the same. Applications of diluted Petrotech 25 in the 6 - 10 percent range via fire fighting equipment can be used on automobile and aviation gasolines together with the lighter oils such as diesel and all jet fuels.

The dosage of Petrotech 25 to be used depends upon two factors:

1. The nature of the oil.
2. The energy used in its application to the contaminated substrate.
3. Conditions for Use: May be used with salt or fresh water. Temperature is not relevant.

VII. TOXICITY AND EFFECTIVENESS

1. Toxicity

MATERIAL TESTED	SPECIES		LC50 (ppm)
Petrotech 25 (neat conc.)	Menidia beryllina	601	96-hour
	Mysidopsis bahia	350	48-hour
No. 2 Fuel Oil	Menidia beryllina	2.8	96-hour
	Mysidopsis bahia	1.8	48-hour
Petrotech 25 & No. 2 Fuel Oil (1:10)	Menidia beryllina	3.4	96-hour
	Mysidopsis bahia	1.0	48-hour
Reference Toxicant (DSS)	Menidia beryllina	7.9	96-hour
	Mysidopsis bahia	19.8	48-hour

VIII. MICROBIOLOGICAL ANALYSIS

Not Applicable. Petrotech 25 contains no microbes or enzymes.

IX. PHYSICAL PROPERTIES

(Liquid concentrate)

1. Flash Point: None

2. Pour Point: 0 C

3. Viscosity: 700 CP

4. Specific Gravity: 1.03

5. pH: 7.5

6. Surface Active Agents: CONFIDENTIAL

7. Solvents: CONFIDENTIAL

8. Additives: CONFIDENTIAL

9. Solubility: 100%

X. ANALYSIS FOR HEAVY METALS AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.10
Cadmium	<0.08
Chromium	<0.10
Copper	<0.26
Lead	0.047
Mercury	<0.0005
Nickel	<0.40
Zinc	0.256
Cyanide	.70
Chlorinated Hydrocarbons	ND

TECHNICAL PRODUCT BULLETIN #SW-22

USEPA, OIL PROGRAM CENTER

ORIGINAL LISTING DATE: 11/12/98

"SPLIT DECISION SC "

(a/k/a CLEAN SPLIT)

I. NAME, BRAND, OR TRADEMARK

SPLIT DECISION SC

Type of Product: Surface Washing Agent (Water Based)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

Mohawk Laboratories

Division of NCH Corporation

2730 Carl Road

Irving, TX 75260

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

For SPLIT DECISION SC:

Mantek

Division of NCH Corporation

P.O. Box 660196

Dallas, TX 75266-0196

Phone: (972) 438-0202

(Mr. George Zimmerman)

For DUO-SPLIT:

Chemsearch

Division of NCH Corporation

Irving, TX 75015

Phone: (972) 438-0202

(Mr. George Zimmerman)

For CLEAN SPLIT:

Certified Laboratories

Division of NCH Corporation

P.O. Box 2493

Ft. Worth, TX 76113-2493

Phone: (972) 438-0202

(Mr. George Zimmerman)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability: Not flammable

2. Ventilation: Not required

3. Skin and eye contact: SPLIT DECISION SC is not aggressive to skin and will not cause irritation in the majority of users. Avoid contact with eyes, irritation may result. Wear safety glasses with side shields if the method of use presents the likelihood of eye contact. No special precautions or additional protective equipment are required during handling or use.

4.a. Maximum storage temperature: 140 F

4.b. Minimum storage temperature: 27 F

SPLIT DECISION SC

4.c. Optimum storage temperature range: 32-140 F

4.d. Temperatures of phase separations and chemical changes: SPLIT DECISION SC is stable and phase separation will not occur at temperatures within the above storage range. Repetitive freeze/thaw cycles may cause stratification. This stratification is readily dispersed by minimal mixing.

V. SHELF LIFE

The recommended shelf life is one year.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method:

Spray on oily surface. SPLIT DECISION SC forms a loose emulsion with oil that separates within seconds. Oil displaced from surface can be skimmed from the rinse water or absorbed with an oil absorbent.

2. Concentration/Application Rate:

For heavy oil apply at a concentration of 1 part SPLIT DECISION SC to 3 parts water. For lighter oil on non-porous substrates use at up to 1 part SPLIT DECISION SC to 30 parts water. For application by hot water pressure washers or steam cleaner, SPLIT DECISION SC may be diluted with as much as 50 parts water.

3. Conditions for Use:

Effective in fresh water, estuarine, and marine environments at normal climatic temperatures. SPLIT DECISION SC contains no known EPA Priority Pollutants.

VII. TOXICITY AND EFFECTIVENESS

1. Toxicity

	SPECIES	LC50 (ppm)
Split Decision	Menidia beryllina	8.27 96-hr
	Mysidopsis bahia	8.20 48-hr
No. 2 Fuel Oil	Menidia beryllina	12.26 96-hr
	Mysidopsis bahia	4.30 48-hr
Split Decision SC & No. 2 Fuel Oil	Menidia beryllina	0.25 96-hr
	Mysidopsis bahia	2.06 48-hr
Reference Toxicant (DSS)	Menidia beryllina	13.8 96-hr
	Mysidopsis bahia	22.2 48-hr

VIII. MICROBIOLOGICAL ANALYSIS

Contains no microorganisms, enzymes, or biological material.

IX. PHYSICAL PROPERTIES

1. Flash Point: None

2. Pour Point: N/A

3. Viscosity: 20 cps - Brookfield #1 spindle @ 20 rpm at 73 ° F

4. Specific Gravity: 1.075 at 73 ° F

SPLIT DECISION SC

5. pH: 7.0
6. Surface Active Agents: Confidential
7. Solvents: Water
8. Additives: Confidential
9. Solubility in Water: Complete

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

COMPOUND	CONCENTRATION (ppm)
Arsenic	<0.05
Cadmium	<0.03
Chromium	<0.03
Copper	0.20
Lead	<0.05
Mercury	<0.03
Nickel	<0.03
Zinc	0.08
Cyanide	<0.1
Chlorinated Hydrocarbons	<0.1

TECHNICAL PRODUCT BULLETIN #SW-23
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: MARCH 1, 1999
REVISED LISTING DATE:
"PETRO-CLEAN "

I. NAME, BRAND, OR TRADEMARK
PETRO-CLEAN
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Alabaster Corporation
6921 Olson
Pasadena, Texas 77505
Phone: (281) 487-5482 or 1 (800) 609-2728
Fax: (281) 487-9014
E-mail: alabcorp@neusoft.com
(Mr. Denny Megarity)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Alabaster Corporation
6921 Olson
Pasadena, Texas 77505
Phone: (281) 487-5482 or 1 (800) 609-2728
Fax: (281) 487-9014

Four Alarm Fire Equipment
P.O. Box 448
South Houston, Texas 77587
Phone: (713) 948-0484
Fax: (713) 910-3300

A.N. Rusche Distributing Company
9223 Eastex Freeway
Houston, Texas 77093

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability: Non-flammable
2. Ventilation: Normal
3. Skin and eye contact: Protective clothing; treatment in case of contact. Eyes-flush with water using eye cup of fountain for 15 minutes. Seek medical attention if irritation persists. Wash contaminated clothing and footwear before reuse. Ingestion - seek medical attention. Inhalation -

PETRO-CLEAN

no medical attention is required.

4.a. Maximum storage temperature: 120F

4.b. Minimum storage temperature: 35F

4.c. Optimum storage temperature range:

4.d. Temperatures of phase separations and chemical changes: None

V. SHELF LIFE

Indefinite when stored properly.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method: Petro-Clean is applied through power washers or even garden type sprayers in light dilution is very effective in removing petrochemical hydrocarbons from rocks, shorelines, sea walls, bridges, and highways. In wetland applications, Petro-Clean prevents hydrocarbons from attaching to grasses, trees, rocks, etc.

2. Concentration/Application Rate: Dilute or use eductors to specified rate and apply through fire hose, power washers, or sprayers to contaminated area. Petro-Clean is a highly concentrated product and must be diluted before use. Dilution ratios vary depending on the specific conditions of the contaminated site. Normal recommended dilutions are from 0.5% to 6%. On heavy or weathered crude, pre-soaking with 6% may be necessary. For light or refined products, apply as 3% to 6% solution. For sheens on water apply a 0.5% to 1.0% solution.

3. Conditions for Use: May be used with salt or fresh water

VII. TOXICITY AND EFFECTIVENESS

1. Toxicity

MATERIAL TESTED	SPECIES	LC50 (ppm)
No. 2 Fuel Oil	Mysidopsis bahia	110 mg/l
	Menidia beryllina	110 mg/l
Petro-Clean	Mysidopsis bahia	110 mg/l
	Menidia beryllina	100 mg/l
Petro-Clean & No. 2 Fuel Oil	Mysidopsis bahia	105 mg/l
	Menidia beryllina	115 mg/l
Reference Toxicant (DSS)	Mysidopsis bahia	0.98 mg/l
	Menidia beryllina	1.14 mg/l

VIII. MICROBIOLOGICAL ANALYSIS

CONFIDENTIAL

IX. PHYSICAL PROPERTIES

1. Flash Point: greater than 200F

2. Pour Point: -17F

3. Viscosity: 1.26 at 75F

4. Specific Gravity: 0.99 at 75F

5. pH: 8.05 (10% solution, s.u.)

PETRO-CLEAN

- 6. Surface Active Agents: CONFIDENTIAL
- 7. Solvents: None
- 8. Additives: CONFIDENTIAL
- 9. Solubility in Water: 100

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

COMPOUND	CONCENTRATION (ppm)
Arsenic	<0.10
Barium	<0.10
Cadmium	<0.10
Chromium	<0.01
Lead	<0.002
Mercury	<0.01
Silver	<0.01
Selenium	<0.01
Cyanide	<2.0
Chlorinated Hydrocarbons	<1.0

TECHNICAL PRODUCT BULLETIN #SW-24
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: July 14, 2000
"DO-ALL #18"

I. NAME, BRAND, OR TRADEMARK

DO-ALL #18

Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

Studin & Associates

301 174th Street, Suite 2417

Sunny Isles, FL 33160

Phone: (305) 623-6379

Fax: (305) 932-4777

(Mr. Lou Goldberg)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

Studin & Associates

301 174th Street, Suite 2417

Sunny Isles, FL 33160

Phone: (305) 623-6379

Fax: (305) 932-4777

(Mr. Lou Goldberg)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability:

DO-ALL #18 is water based, contains no solvents and is non-flammable.

2. Ventilation:

Normal room ventilation.

3. Skin and eye contact; protective clothing; treatment in case of contact:

Avoid contact with skin, eyes, and clothing. Wear safety glasses or goggles and protective gloves when handling. In case of eye contact, flush immediately with water for at least 15 minutes. If persistent irritation occurs, call a physician. For skin contact, wash thoroughly with soap and water.

4.a. Maximum storage temperature: 100°F

4.b. Minimum storage temperature: 35°F

4.c. Optimum storage temperature range: 40°F to 100°F

4.d. Temperatures of phase separations and chemical changes: DO-ALL #18 has a pour point of 32°F and phase separation occurs at 105°F.

V. SHELF LIFE

DO-ALL #18 has a shelf life of at least two (2) years.

DO-ALL #18

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method:

May be diluted with fresh or salt water. For general use, apply by spray, mop, etc. Agitate severe spots, rinse thoroughly for residue-free surface.

2. Concentration/Application Rate:

2.A. To clean oil from beaches, rocks, and piers as a shore-line cleaner, first use a pre-treatment or soaking, using one (1) part DO-ALL #18 diluted with three (3) parts of water. Allow 30 to 45 minutes to soften viscous oil deposits (soak time may vary with temperature, oil density, and degree of weathering). After the soaking period, dilute one (1) part of DO-ALL #18 with 15 parts of water and apply with a high pressure water hose (50 - 100 PSI). Oil released can then be removed by vacuuming, skimmers, or absorbents.

2.B. For normal cleaning of shop machinery, bilges, decks, waterline scum, rigs, and platforms, dilute one (1) part DO-ALL #18 with up to 20 parts of water.

2.C. For heavy cleaning and degreasing of tanks, barges, engine rooms and soot, oil stained concrete, and petroleum based drilling muds, dilute one (1) part DO-ALL #18 with up to 15 parts of water.

2.D. For severe cleaning of holding tanks, grease traps, black magic, crude oil, and Bunker C, dilute one (1) part DO-ALL #18 with up to five (5) parts of water.

2.E. For steam cleaning, dilute one (1) part of DO-ALL #18 with up to 50 parts of water.

2.F. For pressure washing, dilute one (1) part DO-ALL #18 with up to 30 parts of water.

DO NOT USE UNDILUTED ON COMPOSITION FLOORS, WATER-BASED PAINTED SURFACES, OR ALUMINUM,

3. Conditions for Use:

Recommended for cleaning petroleum fractions from beaches, rocks, piers, bilges, decks, waterline scum, rigs, platforms, tanks, barges, engine rooms, machinery, holding tanks, and grease traps.

VII. TOXICITY AND EFFECTIVENESS

1. Toxicity

	SPECIES	LC50 (ppm)
DO-ALL #18	Menidia beryllina	66.10 96-hr
	Mysidopsis bahia	288.00 48-hr
No. 2 Fuel Oil	Menidia beryllina	9.10 96-hr
	Mysidopsis bahia	0.65 48-hr
DO-ALL #18 & No. 2 Fuel Oil	Menidia beryllina	9.38 96-hr
	Mysidopsis bahia	0.57 48-hr
Reference Toxicant (SDS)	Menidia beryllina	6.36 96-hr
	Mysidopsis bahia	16.53 48-hr

VIII. MICROBIOLOGICAL ANALYSIS

Not Applicable

IX. PHYSICAL PROPERTIES

1. Flash Point: >200°F

2. Pour Point: 32°F
3. Viscosity: 1.8 at 68°F
4. Specific Gravity: 1.07 at 68°F
5. pH: 13.1
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: NONE
8. Additives: CONFIDENTIAL
9. Solubility in Water: Soluble with water.

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

COMPOUND	CONCENTRATION (ppm)
Arsenic	ND (<0.02)
Cadmium	ND (<0.02)
Chromium	ND (<0.02)
Copper	0.33
Lead	ND (<0.02)
Mercury	ND (<0.00)
Nickel	ND (<0.10)
Zinc	0.28
Cyanide	0.26
Chlorinated Hydrocarbons	ND (<0.30)

TECHNICAL PRODUCT BULLETIN #SW-25

USEPA, OIL PROGRAM CENTER

ORIGINAL LISTING DATE: July 9, 2001

REVISED LISTING DATE:

"SC-1000™"

I. NAME, BRAND, OR TRADEMARK

SC-1000™

Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

GEMTEK® Products

3808 North 28th Avenue

Phoenix, AZ 85017

Emergency Number: (602) 265-8586 or

(800) 331-7022

FAX: (602) 265-7241

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

GEMTEK® Products

3808 North 28th Avenue

Phoenix, AZ 85017

Emergency Number: (602) 265-8586 or

(800) 331-7022

FAX: (602) 265-7241

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1.Flammability: Non-flammable.

2.Ventilation: General room ventilation is satisfactory.

3.Skin and eye contact; protective clothing; treatment in case of contact: Non-irritating, no first aid needed. May be an eye irritant. Do not spray into eyes; safety glasses are recommended. If irritation does occur, rinse thoroughly with water.

4.a.Maximum storage temperature: None.

b.Minimum storage temperature: Room temperature.

c.Optimum storage temperature range: 70°F to 90°F

d.Temperatures of phase separations and chemical changes: Low temperature can cause handling problems; viscosity of material will increase. The product is an organic compound and it will not typically stratify. The cloud point is 54°F. At 212°F it will boil and at somewhat less (around 130°F) water vapor will form. Repeat freeze/thaw/boiling cycles over a 30-day period has not demonstrated noticeable break down of the product.

SC-1000™

V. SHELF LIFE

Minimum of 5 years.

VI. RECOMMENDED APPLICATION PROCEDURE

1.Application Method: SC-1000™ is a highly concentrated cleaning compound capable of a multitude of cleaning applications with dilutions ranging from full strength to far in excess of 1:350. Depending on the specific factors in the cleaning environment, the desired cleaning speed with the least amount of SC-1000™ can be determined. When diluting, it is recommended that SC-1000™ be added to premeasured water to minimize foaming in the solution.

2.Concentration/Application Rate:

2A.Beach Waterfront, Rocky Soils, Break Water Structures, and Pier Facilities: For beach sands or light rocky soils, burning or creating a temporary shallow wash tank is most successful. Fill one-half of the tank with contaminated beach sand, then add a solution of SC-1000™ and clean water (ocean or fresh) to cover the sand. Gentle agitation will release the oil to the surface of the tank where it can be collected. For rocky surfaces spray with a 20 percent solution of SC-1000™ using a horizontal eductor sprayer, spraying side-to-side, allowing the soil to dwell for several minutes before spraying top-to-bottom with clean ocean or fresh water to rinse oil into perimeter oil booms, blankets or impermeable sheeting.

2B.Washing Marine Vegetation: Use a non-pressure/impact spraying equipment to dispense a 0.01 percent SC-1000™ solution and allow to stand for 5-10 minutes before a final rinsing with fresh or ocean water.

2C.Washing Marine Equipment: For wet oils and bunker crude, use SC-1000™ at 20 percent solution (preferably warmer than 80°F) and spray or wipe. Apply directly to equipment, allow to dwell for 1-2 minutes and then spray rinse with fresh or ocean water. For hardened oils, fuels, and viscous lubricants, apply SC-1000™ blended with SC-Supersolve™ (a non-toxic, low aromatic, water miscible solvent) at the ratio of 80/20 then dilute with water to a 50 percent solution, spray or wipe onto surface, let stand for 1-2 minutes before rinsing.

2D.Heavy Cleaning Examples: Dilution full strength 1:5; diesel engines, auto parts, baked on oil or lube grease, dried oil/enamel, latex paints, thick food syrups, insect smears, dried animal or vegetable fats, hard resins, thick dust-laden oily dirt, asphalt and grass or plant stains.

2E.Average Cleaning Examples: Dilution 1:5 up to 1:20; automotive work counters and tools, food and beverage processing equipment, oily or food-laden floors, manufacturing work areas, vehicle maintenance, shipping containers, utility equipment, and parts washers.

2F.General Maintenance Examples: 1:20 up to 1:100; vehicle washing, general janitorial for offices/schools/hospitals/recreation and related equipment, pressure sprayers, food preparation and storage, painted/plastic laminate surfaces, sports equipment, general cleaning, immersion tanks, and ultrasonics.

3.Conditions for Use:

SC-1000™ may be used on any surface that is compatible with water. The product may tarnish some soft aluminum surfaces if not adequately diluted and rinsed with water.

VII. TOXICITY AND EFFECTIVENESS

1. Toxicity

	SPECIES	LC50 (ppm)
SC-1000™	Menidia beryllina	26.4 96-hr
	Mysidopsis bahia	15.2 48-hr
No. 2 Fuel Oil	Menidia beryllina	8.85 96-hr
	Mysidopsis bahia	1.57 48-hr
SC-1000™ & No. 2 Fuel Oil	Menidia beryllina	4.72 96-hr
	Mysidopsis bahia	2.13 48-hr
Reference Toxicant (SDS)	Menidia beryllina	2.22 96-hr
	Mysidopsis bahia	10.5 48-hr

VIII. MICROBIOLOGICAL ANALYSIS

Not applicable.

IX. PHYSICAL PROPERTIES

1. Flash Point: >212°F
2. Pour Point: 25°F
3. Viscosity: <10 cps @ 25°C
4. Specific Gravity: 1.009
5. pH: 10.2 - 10.5
6. Surface Active Agents: CONFIDENTIAL.
7. Solvents: None.
8. Additives: CONFIDENTIAL.
9. Solubility in Water: Soluble in water.

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

COMPOUND	CONCENTRATION (ppm)
Arsenic	1.33
Cadmium	ND
Chromium	ND
Copper	0.100
Lead	ND
Mercury	ND
Nickel	ND
Zinc	0.20
Cyanide	ND
Chlorinated Hydrocarbons	ND

TECHNICAL PRODUCT BULLETIN #SW-26
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: August 06, 2001
REVISED LISTING DATE:
“GOLD CREW SW”

I. NAME, BRAND, OR TRADEMARK
GOLD CREW SW
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Ara Chem, Inc.
P.O. Box 5031
San Diego, CA 92165-5031
Plant:
808 Gable Way
El Cajon, CA 92020-1989
Phone: (619) 286-4131
Fax: (619) 444-7256
E-mail: arachemgoldcrew@earthlink.net
Web site: www.GOLDCREW.net

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Ara Chem, Inc.
P.O. Box 5031
San Diego, CA 92165-5031
Plant:
808 Gable Way
El Cajon, CA 92020-1989
Phone: (619) 286-4131
Fax: (619) 444-7256
E-mail: arachemgoldcrew@earthlink.net
Web site: www.GOLDCREW.net

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability: Non-flammable.
2. Ventilation: Normal.
3. Skin and eye contact; protective clothing; treatment in case of contact: Extensive testing indicates that GOLD CREW SW is non-hazardous and non-toxic to humans; however, good hygiene practices should always be followed as outlined below:
Eyes- flush with water; get medical attention if required; Skin - remove contaminated clothing, wash exposed area, and wash clothing before use. If irritation develops get medical attention;

GOLD CREW SW

Ingestion - get medical attention if required; Inhalation - none considered necessary.

4.a.Maximum storage temperature: When above 120°F, keep container closed and stored in a cool dark place. Evaporation may change product's characteristics.

b.Minimum storage temperature: Product will freeze below 25°F. No phase separation will occur. If frozen, thaw, and stir well.

c.Optimum storage temperature range: 25°F to 120°F

d.Temperatures of phase separations and chemical changes: No separation at any temperature between 32-120°F. No tendency to "layer out" or separate, standing for 30 days. No separation of layering after freezing.

V. SHELF LIFE

20 years (unopened).

VI. RECOMMENDED APPLICATION PROCEDURE

1.Application Method: Apply through hand pump sprayer and allow to soak.

2.Concentration/Application Rate: As a presoak dilute 20 parts water to 1 part SW. For crude oil, allow about 1 hour. For medium distillates, allow 30 minutes. For light distillates, allow 15 minutes. Time may vary depending on weather conditions. After allowing the solution to presoak, wash the area in the following manner: Apply through a power washer or through a steam powered unit at 1 percent, 3 percent, or 5 percent depending on oil viscosity and temperature.

3.Conditions for Use: Equally effective with salt or fresh water.

VII. TOXICITY AND EFFECTIVENESS

1. Toxicity

	SPECIES	LC50 (ppm)
GOLD CREW SW	Menidia beryllina	13.8 96-hr
	Mysidopsis bahia	20.4 48-hr
No. 2 Fuel Oil	Menidia beryllina	6.75 96-hr
	Mysidopsis bahia	2.82 48-hr
GOLD CREW SW & No. 2 Fuel Oil	Menidia beryllina	6.34 96-hr
	Mysidopsis bahia	2.70 48-hr
Reference Toxicant (SDS)	Menidia beryllina	2.22 96-hr
	Mysidopsis bahia	9.52 48-hr

VIII. MICROBIOLOGICAL ANALYSIS

Not applicable.

IX. PHYSICAL PROPERTIES

1.Flash Point: >200

2.Pour Point: 25°F

3.Viscosity: 33.87 CST

4.Specific Gravity: 1.035

5.pH: 9.76 +/- 0.01

GOLD CREW SW

6.Surface Active Agents: CONFIDENTIAL.

7.Solvents: None.

8. Additives: CONFIDENTIAL.

9.Solubility in Water: Complete.

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

COMPOUND	CONCENTRATION (ppm)
Arsenic	<1.0
Cadmium	<0.10
Chromium	<1.0
Copper	<1.0
Lead	<0.5
Mercury	<0.02
Nickel	<1.0
Zinc	0.44
Cyanide	ND
Chlorinated Hydrocarbons	ND

TECHNICAL PRODUCT BULLETIN #B-10
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: JULY 9, 1985
REVISED LISTING DATE: JANUARY 11, 1996
"INIPOL EAP 22"

I. NAME, BRAND, OR TRADEMARK

Inipol EAP 22

Type of Product: Biological Additive

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

Société CECA S.A.

12 place de l'Iris - Cédex 54

92062 Paris-la-Défense

France

Phone: 011.33.1.47.96.92.91

Telex: CECAS 611444F

Fax: 011.33.1.47.96.92.33

(Mr. Serge Kuchto)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

Elf Aquitaine, Inc.

Suite 500,

1899 L Street, N.W.

Washington, DC 20036

Phone: (202) 659-1810

Fax: (202) 659-1816

Telex: 277566 EXECUR

(Mr. Arnaud Morange)

Elf Atochem North America, Inc.

2000 Market Street, Suite 1900

Philadelphia, PA 19103

Tel: (215) 419-5909

Fax: (215) 419-5670

(Mr. Alain Drexler)

Tel: (215) 419-5517

Fax: (215) 419-5670

(Mr. Jim Lynn)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability:

INIPOL EAP 22 is non-flammable.

2. Ventilation:

Ventilation of the work place is not necessary.

3. Skin and eye contact; protective clothing; treatment in case of contact:

In case of contact with skin or eyes, wash with plenty of water.

4.a. Maximum storage temperature: 122 F

4.b. Minimum storage temperature: 52 F

4.c. Optimum storage temperature range: 55 F-65 F

4.d. Temperatures of phase separations: <52 F and >122 F

V. SHELF LIFE

The recommended shelf life is one year. However, if the product is stored indoors within the optimum temperature range, this shelf life can be extended. For instance, the shelf life can reach 400 days if the product is stored at 60° F. On the contrary, if the storage temperature is higher than the optimum range, the shelf life will decrease. At 86° F the shelf life will be only 100 days.

VI. RECOMMENDED APPLICATION PROCEDURE

1.Application Method:

Application of INIPOL EAP 22 can be made by using any spreading system, including typical spreading systems for marine dispersants. It can be sprayed from airplanes, helicopters, or ships equipped with spray racks. It can also be sprayed with firehose nozzles or any other means allowing product spreading.

2. Concentration/Application Rate:

The application rate is 10% based on amount of oil, i.e., 26 gallons per ton of oil.

3. Conditions for Use:

INIPOL EAP 22 should be used in sea waters with temperatures above 52 F.

It is effective on weathered oils and is recommended for shore cleanup.

VII. a.EFFECTIVENESS

Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:
Summary Data Table

DAYS	PRODUCT	TOTAL MEAN	RED.%	TOTAL MEAN	RED.%
	3 REPLCTS/PROD.	ALKANE (ppm)	28 DAYS	AROMATIC S (ppm)	28 DAYS
0	CONTROL	29965.2	0	5620.5	0
	NUTRIENT	31494.8	0	6660.2	0
	INIPOL EAP 22	30823.2	0	5483.4	0
7	CONTROL	30101.5	0	5610.1	0
	NUTRIENT	8073.9	0	5026.6	0
	INIPOL EAP 22	18804.7	0	5349.8	0
28	CONTROL	28785.6	3.94	5512.7	1.92
	NUTRIENT	706.2	97.76	4863.7	26.97
	INIPOL EAP 22	1888.6	93.87	4208.5	23.25

Results of Gravimetric Analysis

Percentage (%) Decrease in Weight of Oil on Day 28

Control	Nutrient	Product (INIPOL EAP 22)
-6.41%	50.91%	49.95%

b. TOXICITY

MATERIAL TESTED	SPECIES	LC50 (ppm)
INIPOL EAP 22	Menidia beryllina	135 96-hr
	Mysidopsis bahia	23 48-hr
No. 2 Fuel Oil	Menidia beryllina	280 96-hr
	Mysidopsis bahia	47 48-hr
INIPOL EAP 22 & No. 2 Fuel Oil (1:10)	Menidia beryllina	125 96-hr
	Mysidopsis bahia	35 48-hr
Reference toxicant (DSS)	Menidia beryllina	2.7 96-hr
	Mysidopsis bahia	7.0 48-hr

NOTE: This toxicity data was derived using the concentrated product.

See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

VIII. MICROBIOLOGICAL ANALYSIS

In the presence of crude oil treated by INIPOL EAP 22, a considerable growth of the heterotrophic microflora can be observed; the number of bacteria increases from 1,000 per ml. to 1,000,000 per ml. This activity remains constant during the whole test period, while crude oil, just by its presence, creates a fall in the metabolic activities.

IX. PHYSICAL PROPERTIES

1. Flash Point: >212 F
2. Pour Point: 52 F
3. Viscosity: 34 Furol sec at 72F, (250 cPo at 68F)
4. Specific Gravity: 0.996
5. Density: 8.32 lb/gal
6. pH of 10% Solution: 7.0
7. Solubility: in sea water dispersible, in raw water dispersible, in hydrocarbons soluble

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

INIPOL EAP 22 is a microemulsion containing nitrogen and phosphorus compounds in assimilated form. It does not contain any heavy metal, cyanide or chlorinated hydrocarbons.

TECHNICAL PRODUCT BULLETIN #B-19
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: JUNE 18, 1990
REVISED LISTING DATE: JANUARY 11, 1996
"WMI-2000"

I. NAME, BRAND, OR TRADEMARK

WMI-2000

Type of Product: Biological Additive

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

Waste Microbes, Inc.

P.O. Box 924603

Houston, TX 77292-4603

Phone: (713) 956-4001

Or: (800) 460-4507

Fax: (713) 956-7305

(Mr. Joseph F. Jennings)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

Waste Microbes, Inc.

P.O. Box 924603

Houston, TX 77292-4603

Phone: (713) 956-4001

Or: (800) 460-4507

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability:

WMI-2000 is non-flammable.

2. Ventilation:

Avoid breathing dust or aerosol due to possibility of sensitization. Use adequate ventilation.

3. Skin and eye contact; protective clothing; treatment in case of contact:

Minimize contact with eyes, skin, and clothing. Wash hands thoroughly after handling culture.

4.a. Maximum storage temperature: 100 F

4.b. Minimum storage temperature: 35 F

4.c. Optimum storage temperature range: 45 F - 90 F

Store in a cool, dry location. Keep partially-used containers tightly closed. Prolonged exposure to high temperature and humidity, may lower activity of product.

4.d. Temperatures of phase separations and chemical changes: Not Applicable

V. SHELF LIFE

The shelf life of WMI-2000 is 2 years if stored at ambient temperatures

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method:

The culture should be activated for 2 hours in water, when applicable. Conditions for use vary depending on substrate concentration and type, pH, temperature, availability of nutrients, oxygen content, and liquid medium (static or flowing).

2. Concentration/Application Rate:

Inoculation concentration is 5-9 billion spores per gram.

3. Conditions for Use:

Temperature requirements are between 35 F and 100 F. The optimum dissolved oxygen content is 2 ppm at the sludge-to-water interface. Nitrogen and phosphorous are key nutrients which promote cultural growth, and should be maintained at concentrations of 15-20 ppm and 2.5-5 ppm, respectively. The optimum pH range is between 7.0 and 8.0.

VII. EFFECTIVENESS

Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:
Summary Data Table

DAYS	PRODUCT	TOTAL MEAN	RED. %	TOTAL MEAN	RED. %
	3 REPLCTS/PROD.	ALKANE (ppm)	28 DAYS	AROMATIC S (ppm)	28 DAYS
0	CONTROL	2626.7	0	1850.0	0
	NUTRIENT	2763.3	0	2030.0	0
	WMI-2000	2453.3	0	1880.0	0
7	CONTROL	2246.7	0	1823.3	0
	NUTRIENT	1920.0	0	1666.7	0
	WMI-2000	1243.3	0	1456.7	0
28	CONTROL	2240.0	14.7	1866.7	-0.9
	NUTRIENT	1210.0	56.2	1480.0	27.0
	WMI-2000	973.3	60.3	1253.0	33.3

Results of Gravimetric Analysis

Percentage (%) Decrease in Weight of Oil on Day 28

Control

Nutrient

Product (WMI-2000)

0%

25%

44%

VIII. MICROBIOLOGICAL ANALYSIS

CONFIDENTIAL

WMI-2000

IX. PHYSICAL PROPERTIES

Not Applicable

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Not Applicable

TECHNICAL PRODUCT BULLETIN #B-29
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: NOVEMBER 21, 1990
REVISED LISTING DATE: OCTOBER 25, 1995
PRP (Petroleum Remediation Product)
(a/k/a WAPED (Water Pollution Eradication Device))

I. NAME, BRAND, OR TRADEMARK
PRP (Petroleum Remediation Product)
Type of Product: Biological Additive

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Petrol Rem, Inc.
2275 Swallow Hill Road
Building 2500, Second Floor
Pittsburgh, PA 15220
Phone: (412) 279-9745
Fax: (412) 279-1367
(Mr. T. J. Feola)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Petrol Rem, Inc.
2275 Swallow Hill Road
Building 2500, Second Floor
Pittsburgh, PA 15220
Phone: (412) 429-0673
Fax: (412) 279-1367
(Mr. T. J. Feola)

IV. SPECIAL HANDLING AND WORKER PRECAUTION FOR STORAGE AND FIELD APPLICATION

1. Flammability:

Wax-based microshell is flammable; water-based core is non-flammable.

2. Ventilation:

Wax and aqueous-based product does not emit hazardous vapors; needs no ventilation.

3. Skin and eye contact; protective clothing; treatment in case of contact:

The product is not a primary dermal irritant, but when suspended in water, it has the potential for slight irritation. Caution is suggested. Facilities for instant and copious water flushing should be provided. Dilutions of the product are non-irritants. Protective clothing should be worn as a precaution when applying product manually. The product, in concentrate form, may cause ocular irritation; adequate protection such as chemical goggles is suggested against eye exposure to dry product. Facilities for instant and copious water flushing should be provided, and prompt medical attention should be sought if eyes are exposed.

PRP (Petroleum Remediation Product)

- 4.a. Maximum storage temperature: 120 F
- 4.b. Minimum storage temperature: None
- 4.c. Optimum storage temperature range: 36 F-86 F
- 4.d. Temperatures of phase separations and chemical changes: 40 F-86 F

V. SHELF LIFE

PRP has a shelf life of 2 or more years.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method:

Surface spray.

Aerial spray/deposition (seeding)

Manual surface application (sprinkle)

2. Concentration/Application Rate:

No dilution required. One ton of PRP covers 40,000 square feet to a depth of 1/4 inch.

No data available for usage per ton of oil.

3. Conditions for Use:

Variations of seawater salinity have no effect.

Reaction time decreases inversely with temperature; optimum temperature is 60 F.

No information available as to the effects concerning types and ages of pollutants.

May be applied regardless of climatic conditions on land or in fresh or sea waters.

VII. EFFECTIVENESS

Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:
Summary Data Table

DAYS	PRODUCT	TOTAL MEAN	RED. %	TOTAL MEAN	RED. %
	3 REPLCTS/PROD.	ALKANE (ppm)	28 DAYS	AROMATIC S (ppm)	28 DAYS
0	CONTROL	29959.5	0	5391.8	0
	NUTRIENT	29008.5	0	5163.0	0
	PRP	86303.1	0	4890.6	0
7	CONTROL	33471.3	0	5720.9	0
	NUTRIENT	22723.7	0	5050.1	0
	PRP	78641.0	0	5359.7	0

PRP (Petroleum Remediation Product)

DAYS	PRODUCT	TOTAL MEAN	RED.%	TOTAL MEAN	RED.%
	3 REPLCTS/PROD.	ALKANE (ppm)	28 DAYS	AROMATIC S (ppm)	28 DAYS
28	CONTROL	30997.4	0	5388.9	6.0
	NUTRIENT	1103.9	96.0	4582.4	7.0
	PRP	75629.6	12.0	4952.6	3.0

Results of Gravimetric Analysis

Percentage (%) Decrease in Weight of Oil on Day 28

Control

0%

Nutrient

19%

Product (PRP)

1%

VIII. MICROBIOLOGICAL ANALYSIS

1. Enzyme Names:

Oxidoreductases, transferases, hydrolases, lyases, isomerases, lipases.

2. Sources of enzymes:

Microorganisms

3. Optimum conditions:

pH: 7.0

Temperature: 60 F

Salinity range: Fresh to sea water

Minimum pH: 3.5

Maximum pH: 8.5

4. Temperature and salinity levels above or below which effectiveness is reduced to half its optimum capacity:

Unknown

5. Enzyme shelf life:

At least 2 years under proper storage conditions.

6. Enzyme optimum storage conditions:

Temperatures no higher than 90F

7. Special microbiological listings:

Negative test results were obtained from the following organisms: Salmonella, fecal coliforms, Shigella, beta hemolytic Streptococcus, and coagulase positive Staphylococcus.

IX. PHYSICAL PROPERTIES

Coated microcapsules ranging in size from .25 to 500 micrometers.

PRP (Petroleum Remediation Product)

TECHNICAL PRODUCT BULLETIN #B-35
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: JUNE 21, 1991
REVISED LISTING DATE: OCTOBER 6, 1996
"BIOGEE HC"

I.NAME, BRAND, OR TRADEMARK

BioGEE HC

Type of Product: Biological Additive

II.NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

RMC Bioremediation

143 Albert Ave.

Shreveport, LA 71105

(318) 219-3929

(888) 339-3929

Fax: (318) 219-3919

E-mail: rmcbio@bellsouth.net

Web page: www.rmcbio.com

(Mr. Trey Barber)

III.NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

RMC Bioremediation.

Microbes

16770 Hedgcroft, #714

7876 Stage Hills Blvd #107

Houston, TX 77060

Bartlett, TN 38133

Phone: (281) 260-9227

Phone: (800) 499-9205

Fax: (281) 260-0377

(Mr. David Flagg)

(Ms. Candy Kirk)

VI.SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1.Flammability:

Not Applicable

2.Ventilation:

None

3.Skin and eye contact; protective clothing; treatment in case of contact:

The use of protective gloves and chemical goggles is recommended when using this product.

4.a.Maximum storage temperature: 140 F

4.b.Minimum storage temperature: 32 F

4.c.Optimum storage temperature range: 34 F to 140 F

V.SHELF LIFE

The shelf life of BioGEE HC is 2 years.

BIOGEE HC

VI.RECOMMENDED APPLICATION PROCEDURE

1.Application Method:

Spray

2.Concentration/Application Rate:

Use one gallon of BioGEE HC to treat 4,000 square feet of oil contaminated water or one (1) cubic yard of oil contaminated soil.

3.Conditions for Use:

The optimum temperature for BIOGEE HC is 83 F. Variations in sea water salinity may have slight effects on the product's effectiveness.

VII.EFFECTIVENESS

Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:
Summary Data Table

DAYS	PRODUCT	TOTAL MEAN	RED.%	TOTAL MEAN	RED.%
	3 REPLCTS/PROD.	ALKANE (ppm)	28 DAYS	AROMATIC S (ppm)	28 DAYS
0	CONTROL	2590.0	0	1963.3	0
	NUTRIENT	2446.7	0	1940.0	0
	BIOGEE HC	N/A	0	N/A	0
7	CONTROL	1936.7	0	1966.7	0
	NUTRIENT	1890.0	0	1936.7	0
	BIOGEE HC	N/A	0	N/A	0
28	CONTROL	2216.7	14.4	1976.7	-0.7
	NUTRIENT	1080.0	55.9	1550.0	20.1
	BIOGEE HC	N/A	N/A	N/A	N/A

Results of Gravimetric Analysis

Percentage (%) Decrease in Weight of Oil on Day 28

Control	Nutrient	Product (BIOGEE HC)
1.0%	33.0%	13.0%

VIII.MICROBIOLOGICAL ANALYSIS

1.Listing of all microorganisms by species and percentage in the composition:

CONFIDENTIAL

2.Optimum pH, temperature, and salinity ranges for use of the additives:

Optimum pH: 7.0, (4.5 to 9.5)

BIOGEE HC

Optimum temperature: 83 F, (34 F to 140 F)

Optimum salinity: None

3. Minimum and maximum pH, temperature, and salinity levels below or above which the effectiveness of the additive is reduced to half its optimum capacity:

pH: <4.5 and >9.5

Temperature: <40 F and >140 F

Salinity: None, (Variations of salinity may have slight effects).

4. Special nutrient requirements

There are no special nutrient requirements.

5. Test results regarding the determination of the presence of the following:

Salmonella: None found

Fecal coliform: None found

Shigella: None found

Staphylococcus coagulase positive: None found

Beta hemolytic Streptococci: None found

TECHNICAL PRODUCT BULLETIN #B-36
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: JULY 17, 1991
REVISED LISTING DATE: OCTOBER 6, 1996
"OPPENHEIMER FORMULA"
(a/k/a The Oppenheimer Formula I)

I.NAME, BRAND, OR TRADEMARK
Oppenheimer Formula
Type of Product: Biological Additive

II.NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Oppenheimer Biotechnology, Inc.
P.O. Box 5919
Austin, TX 78763
Phone: (800) 835-2275 or
Phone: (512) 474-1016
Fax: (512) 472-2909
(Dr. C. Oppenheimer)

III.NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Oppenheimer Biotechnology, Inc.
P.O. Box 5919
Austin, TX 78763
Phone: (800) 835-2275 or
Phone: (512) 474-1016
Fax: (512) 472-2909
(Dr. C. Oppenheimer)

IV.SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1.Flammability:

Non-flammable

2.Ventilation:

Special ventilation is not required. Treat product as an hygroscopic powder. In closed spaces use dust protective measures.

3.Skin and eye contact; protective clothing; treatment in case of contact:

The application of the dry powder requires the usual precautions of a dust irritant to membranes.

The material is easily removed by washing or flushing, and in confined areas or use, a protective mask and eye glasses are recommended.

4.a.Maximum storage temperature: 130 F

4.b.Minimum storage temperature: 32 F

4.c.Optimum storage temperature range: 82 F

OPPENHEIMER FORMULA

V.SHELF LIFE

The shelf life of the product is approximately 5 year.

VI.RECOMMENDED APPLICATION PROCEDURE

1.Application Method:

Optimal application is by powder seeding directly at the source of oil contamination.

Application over larger areas of water surface can be accomplished by aerial powder dusting, spraying a water mixture of nutrients/formula over the oil area, or by dusting with mechanical powder pumps.

2.Concentration/Application Rate:

The application rate at the source oil slick is 1 pound per cubic yard of oil.

In the open sea slick, the basic application rate is 10 pounds per acre, but this may vary in different situations related to speed of clean up.

In estuaries, a larger biomass is recommended and may be at a rate of up to 100 pounds per acre, depending on the oil type and concentration.

Heavier oils may require a higher biomass than light oils.

3.Conditions for Use:

THE OPPENHEIMER FORMULA may be used in a wide range of environmental conditions of temperature and salinities, ranging from fresh to 100 ppt salts. The formula is especially valuable in grass flats, marshes and the open sea. It has also proved effective in soil and fresh water oil clean up and municipal waste treatment, septic tanks and grease traps.

VII.EFFECTIVENESS

Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:
Summary Data Table

DAYS	PRODUCT	TOTAL MEAN	RED.%	TOTAL MEAN	RED.%
	3 REPLCTS/PROD.	ALKANE (ppm)	28 DAYS	AROMATIC S (ppm)	28 DAYS
0	CONTROL	29965.2	0	5620.5	0
	NUTRIENT	31494.8	0	6660.2	0
	OPPENHEIMER	31140.6	0	5528.2	0
7	CONTROL	30101.5	0	5610.1	0
	NUTRIENT	8073.9	0	5086.6	0
	OPPENHEIMER	5019.7	0	4338.9	0
28	CONTROL	28785.6	3.9	5512.7	1.9
	NUTRIENT	706.2	97.8	4863.7	27.0

DAYS	PRODUCT	TOTAL MEAN	RED. %	TOTAL MEAN	RED. %
	3 REPLCTS/PROD.	ALKANE (ppm)	28 DAYS	AROMATIC S (ppm)	28 DAYS
	OPPENHEIMER	3396.8	89.1	3417.8	38.2

Results of Gravimetric Analysis

Percentage (%) Decrease in Weight of Oil on Day 28

Control	Nutrient	Product (Oppenheimer)
- 6.4 %	50.9 %	10.4 %

VIII.MICROBIOLOGICAL ANALYSIS

1.Listing of all microorganisms by species and percentage in the composition:

Natural, ubiquitous, hydrocarbon-oxidizing, microorganisms for use in removing hydrocarbons and organic materials from soils, fresh and salt waters by natural oxidative pathways.

2.Optimum pH, temperature, and salinity ranges for use of the additive:

pH: 7.6

Temperature: 82 F

Salinity: Fresh water to 20 percent salts.

Optimal: .5 to 3.5 percent.

3.Minimum and maximum pH, temperature, and salinity levels below or above which the effectiveness of the additive is reduced to half its optimum capacity:

pH: 5.5-11

Temperature: 32 F-140 F

Salinity: fresh to 15%

4.Special nutrient requirements:

Not applicable

5.Test results regarding the determination of the presence of the following:

Salmonella: none found

Fecal Streptococci: <90/100 ml

Shigella: none found

Staphylococcus Coagulase positive: none found

Beta hemolytic Streptococci: none found

OPPENHEIMER FORMULA

TECHNICAL PRODUCT BULLETIN #B-37
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: AUGUST 9, 1991
REVISED LISTING DATE: DECEMBER 6, 1995
"BR"
(formerly Enviro-Zyme BR)
(a/k/a BIOTA EARTH)

I.NAME, BRAND, OR TRADEMARK
BR
Type of Product: Biological Additive

II.NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Enviro-Zyme, Inc.
P.O. Box 169
Stormville, NY 12582
Phone: (914) 878-3667 or (800) 882-9904
Fax: (914) 878-7917
(Mr. Jay Silverstein)

III.NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Enviro-Zyme, Inc.
P.O. Box 169
Stormville, NY 12582
Phone: (914) 878-3667 or (800) 882-9904
Fax: (914) 878-7917
(Mr. Jay Silverstein)

IV.SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1.Flammability:

Non-flammable

2.Ventilation:

Normal ventilation is adequate

3.Skin and eye contact; protective clothing; treatment in case of contact:

In case of skin contact, wash hands with water and limit exposure if redness develops. Wash hands thoroughly after handling. In case of eye contact, flush with water for at least 15 minutes, and contact physician. Wear dust mask and protective goggles when handling large amounts due to nuisance (fugitive) dust. Protective gloves and long sleeve clothing are recommended.

4.a.Maximum storage temperature: <120 F

4.b.Minimum storage temperature: 40 F

4.c.Optimum storage temperature range: >40 F to <120 F

BR

V.SHELF LIFE

The shelf life of BR is 1 year if it is kept dry, reasonably cool (<120 F), and out of sunlight.

VI.RECOMMENDED APPLICATION PROCEDURE

1.Application Method:

Mix BR into a slurry and apply using a 60-90 degree low pressure course spray nozzle. Saturate the contaminated area. Repeat every 7 days.

2.Concentration/Application Rate:

For soil contamination, use one-half pound per ton of soil.

For water contamination, use two pounds per 100,000 gallons of water.

For biofarming and bioslurry, use one-half pound per ton of sludge or soil. Add directly to bioslurry reactor.

For biostimulation, use two pounds per 100,000 gallons of water. Add directly to the biotreater or bioreactor.

3.Conditions for Use:

BR is a dry, solid, bacterial/enzyme product that remains in a dormant state until moistened. Once moistened, the product should be used within hours.

VII. EFFECTIVENESS

Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:
Summary Data Table

DAYS	PRODUCT	TOTAL MEAN	RED.%	TOTAL MEAN	RED.%
	3 REPLCTS/PROD.	ALKANE (ppm)	28 DAYS	AROMATIC S (ppm)	28 DAYS
0	CONTROL	2256.66	0	1853.33	0
	NUTRIENT	2253.33	0	1700.00	0
	BR	2203.33	0	1870.00	0
7	CONTROL	2133.33	0	1903.33	0
	NUTRIENT	2210.00	0	2046.66	0
	BR	1853.33	0	1550.00	0
28	CONTROL	2146.66	4.87	1890.00	-1.98
	NUTRIENT	1633.33	27.50	1913.33	-12.55
	BR	1026.67	52.40	1383.33	26.90

Results of Gravimetric Analysis

Percentage (%) Decrease in Weight of Oil on Day 28

Control	Nutrient	Product (BR)
1.0%	15.0%	25.0%

VIII.MICROBIOLOGICAL ANALYSIS

1.Listing of all microorganisms by species and percentage in the composition: CONFIDENTIAL

2.Optimum pH, temperature, and salinity ranges for use of the additive: pH: 6-7

Temperature: 104 F-122 F

Salinity: fresh water to sea water

3.Minimum and maximum pH, temperature, and salinity levels below or above which the effectiveness of the additive is reduced to half its optimum capacity:

pH: 4.5-9.5

Temperature: 55 F-142 F

Salinity: 2.5%-5.5%

4.Special nutrient requirements:

Nutrient additive is composed of urea, methylene ureas and ammonium phosphate.

5.Test results regarding the determination of the presence of the following:

Salmonella: None found

Fecal coliform: <50/g

Shigella: None found

Staphylococcus Coagulase positive: None found

Beta hemolytic Streptococci: None found

IX.ENZYME INFORMATION

1.Enzyme Names: Carbohydases, Lipases, Proteases.

2.I. U. B. #: CONFIDENTIAL

3.Sources of Enzymes: CONFIDENTIAL

4.Enzyme units: CONFIDENTIAL

5.Specific activity: CONFIDENTIAL

6.Optimum Conditions:

pH: 6.0-7.0

Temperature: 104 F-122 F

Salinity range: 2.5%-5.5%

Minimum pH: 4.5

Maximum pH: 9.5

7.Temperatures and salinity levels above and below which effectiveness is reduced to half its optimum capacity:

Temperature: 55 F and 142 F

Salinity: <0.5% and >7.0%

8.Enzyme shelf life: One year

9.Enzyme optimum storage condition:

Dry, reasonably cool (below 120 F), and out of sunlight.

TECHNICAL PRODUCT BULLETIN #B-41
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: DECEMBER 18, 1991
REVISED LISTING DATE: JANUARY 21, 1997
"MICRO-BLAZE"

I.NAME, BRAND, OR TRADEMARK

MICRO-BLAZE

Type of Product: Biological Additive

II.NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

Verde Environmental, Inc.

7309 Schneider

Houston, TX 77093-8501

Phone: (713) 691-6468 or (800) 626-6598

Fax: (713) 691-2331

(Mr. Charles S. Cox)

III.NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

Verde Environmental, Inc.

7309 Schneider

Houston, TX 77093-8501

Phone: (713) 691-6468 or (800) 626-6598

Fax: (713) 691-2331

(Mr. Charles S. Cox)

IV.SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1.Flammability:

Non-flammable

2.Ventilation:

Normal room ventilation

3.Skin and eye contact; protective clothing; treatment in case of contact:

Avoid eye contact. Wear protective gloves, and wash hands with soap and water after handling the product. Wash contaminated clothing and footwear before reuse.

4.Optimum Storage Conditions:

Minimum and maximum storage temperature - 35°-120°

V.SHELF LIFE

Indefinite with proper storage. Freezing will not kill these microbes but extreme heat for long periods of time will kill the microbes.

MICROBLAZE

VI. RECOMMENDED APPLICATION PROCEDURE

Micro-Blaze is a liquid formulation of several microbial strains, surfactants and nutrients designed to digest organics and hydrocarbons in soil and water as well as control odors.

1. Application Method:

Emergency Spills - Any normal spray equipment, fire or response equipment, eductors, hose lines, water trucks, etc.

Bioremediation & UST's - Applied as above for surface uses and can be applied via bioreactors or through underground systems using perforated pipes. In situ or ex situ. Use landfarm, windrow, bio slurry, etc.

Waste Water Treatment Plants & Drain Lines - Lightly sprayed on surface of first basins for grease build-up or can be used through timed drip systems at lift stations and drains.

2. Concentration/Application Rate:

Emergency Spills - Standard rates for hydrocarbon and organic based spills are 3% to 6% concentration with water applied as above.

Bioremediation & USTs - Concentrate is applied with water at rates from 1% to 10%. Several interval applications may be required. Due to varying factors, contact Verde Environmental for specific information.

Waste Water Treatment Plants & Drain Lines - Rule of thumb is one (1) gallon of Micro-Blaze per one (1) million gallon flow. Contact Verde Environmental for specific information.

3. Conditions for Use:

Water Salinity: Any fresh, brackish or brine may be used. However, brine reduces the effectiveness of the microbes by 10%.

Water Temperature: - 35° - 180°

pH: Range - 4 to 11.5

Temperature Range - 32° - 120°

Nutrient Requirements - Site specific. Additional applications of Bio-Catalyst may be added for large spill clean-up and bioremediation projects.

Type and Ages of Pollutants: Organics and hydrocarbon based materials. These strains of bacteria provide the capability of biodegrading various straight chained, branched chained, aromatic and polynuclear aromatic hydrocarbons found in diesel and other fuels. Age is not a factor as much as the density of the contaminant. Tar-like substances may need to be cut for timely remediation.

VII. TOXICITY AND EFFECTIVENESS

Non-toxic, naturally-occurring spore forming micro-organisms common to soil, non-pathogenic, certified by count and will not mutate.

VIII. MICROBIOLOGICAL ANALYSIS

1. Listing of all micro-organisms by species and percentage in the composition. CONFIDENTIAL

2. Test results regarding the determination of the presence of the following:

Product is determined to be free of gram negative contamination.

SALMONELLA	NONE
FECAL COLIFORM	NONE
SHIGELLA	NONE

MICROBLAZE

STAPHYLOCOCCUS	NONE
COAGULASE	NONE
STEPOCOCCUS	NONE

IX.EFFECTIVENESS

Bioremediation Agent Effectiveness Test (40 CFR 300,900) Federal Register September 15, 1994.

Microbiological Results - Average

Day 0 - 1.7×10^9 Day 7 - 8.43×10^8 Day 28 - 5.2×10^7

The organisms in this product convert to a spore state (dormant) to survive an unfavorable environment and will reactivate upon favorable conditions. Documentation available from Verde Environmental.

Summary Data Table

DAYS	PRODUCT	TOTAL MEAN	RED.%	TOTAL MEAN	RED.%
	3 REPLCTS/PROD.	ALKANE (ppm)	28 DAYS	AROMATIC S (ppm)	28 DAYS
0	CONTROL	31258.6	0	973	0
	NUTRIENT	28251.8	0	976.6	0
	MICRO-BLAZE	29548.9	0	1081.2	0
7	CONTROL	31401.73	0	990.5	0
	NUTRIENT	20728.3	26.6	619.1	36.6
	MICRO-BLAZE	12870.5	56.4	496.3	54.1
28	CONTROL	32465.8	0	925.7	0
	NUTRIENT	1787.2	93.7	722.6	26.0
	MICRO-BLAZE	1758.2	94.1	566.9	47.6

Alkanes showed significant reductions with aromatic components less dramatic but still significant.

Results of Gravimetric Analysis:

Percentage (%) Decrease in Weight of Oil on Day 28

CONTROL: <1% NUTRIENT: <17.6% MICRO-BLAZE: 12%

CONCLUSIONS: The Micro-Blaze product shows an initial rapid consumption of all measured hydrocarbons at seven (7) days. This rate apparently slows over 28-day period in a closed environment which may be due to a change in the environment of the flask due to the rapid degradation rates. Because of the high microbial population at the end of the test, it is to be assumed that the quantity of metabolites might account for the increased weight as determined by the gravimetric analysis.

MICROBLAZE

TECHNICAL PRODUCT BULLETIN #B-42

USEPA, OIL PROGRAM CENTER

ORIGINAL LISTING DATE: JANUARY 3, 1992

REVISED LISTING DATE: FEBRUARY 5, 1997

"VB591TMWater, VB997TMSoil, and BiNutrix" - Patented, partial encapsulated oleophilic (oil-loving) nutrient
(formerly MycoBac TX-20)

I. NAME, BRAND, OR TRADEMARK

VB591TMWater, VB997TMSoil, and BiNutrix

Type of Product: Biological Additive (a nutrient additive that contains no microorganisms)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

BioNutraTech Inc.

P.O. Box 691171

Houston, TX 77269-1171

Phone: (281) 894-7371

Fax: (281) 894-7044

(Ms. Sandra Hruza, President)

E-mail: shruza@bionutrtech.com

or: bninfo@bionutrtech.com

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

United States

Cynthia Group

698 E. Washington Blvd.

Medina, OH 44256

Phone: (330) 721-7141

Fax: (330) 721-9139

e-mail: nutrient@bright.net

(Cynthia Girdler, C.E.O.)

Ireland

(VB591 or VB997 - Hydrocarbons)

K.T. Cullen & Co., LTD

Bracken Business Park

Bracken Road

Sandy Ford, Industrial Estate

Dublin, Ireland

Phone: 011-353-1-294-1717

(Michael Cunningham)

(BiNutrix - Wastewater, Greasetraps)

55 Lower O'Connell

Dublin 1, Ireland

Phone: 011-353-868605-774

(Tom Sheehan)

VB591TMWATER, VB997TMSOIL,
AND BINUTRIX

Kazakhstan: Czech and Slovak Republics
Meridian International Trade Corp.
P.O. Box 747
Crown Point, IN 46307
Phone: (219) 662-1357
(Dr. Zolan Obradovic, Ph.D)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability:

Non-flammable

2. Ventilation:

Normal ventilation is adequate.

3. Skin and eye contact; protective clothing; treatment in case of contact:

Avoid contact with eyes and do not take internally. Upon contact with eyes, flush with water immediately for a minimum of 15 minutes. If redness or irritation continues, contact a physician.

Avoid breathing dust. Normal protective equipment for handling any type of powder, such as dust mask and eye shield, can be used.

4.a. Maximum storage temperature: 140°F

b. Minimum storage temperature: Not applicable

c. Optimum storage temperature range: 50°F to 80°F

V. SHELF LIFE

The shelf life is approximately three years if kept dry. Store in dry location and avoid contact with moisture. Prolonged storage may result in the formation of soft clumps which are easily broken by mechanical disruption.

VI. RECOMMENDED APPLICATION PROCEDURE

VB591™Water, VB997™Soil, and BiNutrix is a powder, and can be applied using conventional powder spraying equipment. No pre-mixing or dilution is required.

1. Application Method:

Application for localized spills can be done using hand-held pressurized dust blowers.

For inland waterways, ship channels, marinas or coastal wetlands, large dust blowers mounted on barges or ships can be employed to apply the product.

Application by aircraft using conventional dust spraying systems is recommended for treatment of large uncontained spreading spills or spills in open waters or at sea.

2. Concentration/Application Rate:

Recommended initial application rate is 5 to 15 pounds of VB591™Water, VB997™Soil, and BiNutrix per barrel of spilled oil. Follow-up applications at 48 to 72 hour intervals should be adjusted to allow for reduction in oil due to clean-up activities and natural loss by evaporation, droplet formation and dispersion and microbial activity.

Applications should not exceed 250 pounds per acre per application.

VB591™WATER, VB997™SOIL,
AND BINUTRIX

3. Conditions for Use:

VB591™Water, VB997™Soil, and BiNutrix should be applied to spilled oil as soon as possible following spillage to stimulate natural oil utilizing microbial populations to maximize biodegradation activity.

Application of VB591™Water, VB997™Soil, and BiNutrix to spilled oil does not significantly alter the physical consistency of the spilled oil, and as such will not adversely affect conventional cleanup activities, nor will conventional and removal activities adversely affect the activity of VB591™Water, VB997™Soil, and BiNutrix.

Information regarding use of VB591™Water, VB997™Soil, and BiNutrix in conjunction with chemical dispersing agents is at present not available.

VII. EFFECTIVENESS

Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:

Summary Data Table

DAYS	PRODUCT	TOTAL MEAN	RED.%	TOTAL MEAN	RED. %
	3 REPLCTS/PROD.	ALKANE (ppm)	28 DAYS	AROMATICS (ppm)	28 DAYS
0	CONTROL	31041.7	0	973.1	0
	NUTRIENT	28251.8	0	976.6	0
	VB591™WATER, VB997™SOIL, and BINUTRIX	28813.8	0	932.8	0
7	CONTROL	31436.33	0	990.5	0
	NUTRIENT	20728.3	26.6	619.1	36.6
	VB591™WATER, VB997™SOIL, and BINUTRIX	14637.4	49.2	733.1	21.4
28	CONTROL	32465.8	0	925.7	0
	NUTRIENT	1787.2	93.7	722.6	26.0
	VB591™WATER, VB997™SOIL, and BINUTRIX	937.97	96.8	290.8	73.1

VB591™WATER, VB997™SOIL,
AND BINUTRIX

Results of Gravimetric Analysis

Percentage (%) Decrease in Weight of Oil on Day 28

Control	Nutrient	Product (VB591™Water, VB997™Soil, and BiNutrix)
<1%	17.6%	18.0%

VIII. MICROBIOLOGICAL ANALYSIS

VB591™Water, VB997™Soil, and BiNutrix is an oleophilic nutrient additive and contains no preserved natural or mutated microorganisms of any type.

1. Listing of all microorganisms by species and percentage in the composition:

None

2. Optimum pH, temperature, and salinity ranges for use of the additive:

VB591™Water, VB997™Soil, and BiNutrix may be used under any conditions where natural populations of oil-degrading microbes are active.

3. Minimum and maximum pH, temperature, and salinity levels below or above which the effectiveness of the additive is reduced to half its optimum capacity:

pH: Not applicable

Temperature: Not applicable

Salinity: Not applicable

4. Special nutrient requirements:

None

5. Test results regarding the determination of the presence of the following:

Salmonella: Not applicable

Fecal coliform: Not applicable

Shigella: Not applicable

Staphylococcus coagulase positive: Not applicable

Beta hemolytic Streptococci: Not applicable

VB591™WATER, VB997™SOIL,
AND BINUTRIX

TECHNICAL PRODUCT BULLETIN #B-43
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: MARCH 12, 1992
REVISED LISTING DATE: MARCH 21, 1997
"STEP ONE"*
(a/k/a B&S INDUSTRIAL)

I.NAME, BRAND, OR TRADEMARK

Step One

Type of Product: Biological Additive

II.NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

B & S Research, Inc.

4345 Highway 21

Embarrass, MN 55732

Phone: (218) 984-3757

Fax: (218) 984-3212

(Mr. H. W. Lashmett)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

B & S Research, Inc.

4345 Highway 21

Embarrass, MN 55732

Phone: (218) 984-3757

Fax: (218) 984-3212

Bioremedics International

4345 Highway 21

Embarrass, MN 55732

Phone: (218) 984-3757

Fax: (218) 984-3212

Farm for Profit Research
and Development

4345 Highway 2

Embarrass, MN 55732

Phone: (800) 232-7692

Fax: (218) 984-3212

Solv-O Corporation

12055 Universal Drive

Taylor, MI 48180

Phone: (313) 946-4440

or (800) 594-9028

Fax: (313) 946-0905

IV.SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1.Flammability:

None

2.Ventilation:

Normal ventilation is adequate

3.Skin and eye contact; protective clothing; treatment in case of contact:

Avoid contact with skin, especially when there are open wounds. In case of skin contact, wash with soapy water. The use of protective gloves is recommended. Avoid contact with eyes. In case of eye contact, immediately flush

STEP ONE

eyes with plenty of water continuously for at least 15 minutes. Consult a physician. The use of protective goggles is recommended. Avoid inhalation and ingestion. It is recommended that workers wear dust mask and not eat or smoke while handling the product(s).

4.a.Maximum storage temperature: 90 F

4.b.Minimum storage temperature: -30 F

4.c.Optimum storage temperature range: 32 F to 70 F

V.SHELF LIFE

Over 3 years

VI.RECOMMENDED APPLICATION PROCEDURE

1.Application Method:

Components of the product STEP-1 (BC101) and STEP-1 (MSE2.5) are only sold together. B & S Research will make application recommendations based on contamination and ppm of contamination at time of purchase order and employ specified application methods (spray, plowing, agitation, etc.) appropriate for a particular situation.

2.Concentration/Application Rate:

Nominally, the STEP-1-water mixture can be used on most hydrocarbons, including crude and refined petroleum products, pesticides, etc., on land, fresh water or ocean water. Laboratory tests also indicate effectiveness in destruction of PCB's. In certain circumstances, B& S Research, Inc. may require laboratory soil and water contamination tests before the product may be used (see VI 1. above).

VII.EFFECTIVENESS

Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:
Summary Data Table

DAYS	PRODUCT	TOTAL MEAN	RED. %	TOTAL MEAN	RED. %
	3 REPLCTS/PROD.	ALKANE (ppm)	28 DAYS	AROMATICS (ppm)	28 DAYS
0	CONTROL	29959.5		5391.8	
	NUTRIENT	29008.5		5163.0	
	STEP-ONE	30477.8		5499.8	
7	CONTROL	33471.3		5720.9	
	NUTRIENT	22723.7		5050.1	
	STEP-ONE	24196.8		3110.2	
28	CONTROL	30997.4	0.0 %	5388.9	0.0 %

STEP ONE

DAYS	PRODUCT	TOTAL MEAN	RED. %	TOTAL MEAN	RED. %
	3 REPLCTS/PROD.	ALKANE (ppm)	28 DAYS	AROMATICS (ppm)	28 DAYS
	NUTRIENT	1103.9	96.19%	4582.4	11.23%
	STEP-ONE	17059.4	44.03%	2501.9	54.51%

Results of Gravimetric Analysis

Percentage (%) Decrease in Weight of Oil on Day 28

Control	Nutrient	Product (STEP ONE)
0%	19%	51%

VIII.MICROBIOLOGICAL ANALYSIS

1.Listing of all microorganisms by species and percentages in the composition:

CONFIDENTIAL

2.Optimum pH, temperature, and salinity ranges for use of the additive:

pH: 6-8

Temperature: 70 F to 90 F

Salinity: Fresh or salt (ocean <110 ppm) water, land or dry surfaces

3.Minimum and maximum pH, temperature, and salinity levels below or above which the effectiveness of the additive is reduced to half its optimum capacity:

pH: <5 or <9, (apply neutralizing agents -- lime or P205

Temperature: <50 F or >135 F

Salinity: <0 or >110 ppm

4.Special nutrient requirements:

None

5.Test results regarding the determination of the presence of the following:

Salmonella: None found

Fecal coliform: None found

Shigella: None found

Staphylococcus coagulase positive: None found

Beta hemolytic Streptococci: None found

IX.PHYSICAL PROPERTIES

1.Flash Point: >212 F

2.Pour Point: -7 F

3.Viscosity: 2.8 cst at 50 F

3.5 cst at 32 F

5.9 cst at -4 F

4.Specific Gravity: 1.03 at 59 F

STEP ONE

5.pH: 7.2 (1:2.5:80 BC101:MSE2.5:water mixture)
6.Chemical Name and Percentage by Weight of the Total Formulation:
CONFIDENTIAL
7.Surface Active Agents: Noedal
8.Solvents: None
9.Additives: Phosphoric acid as P205
3% emulsifier <.5% by weight
10.Solubility: Infinite

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration
Arsenic	<0.0200
Cadmium	<0.0030
Chromium	0.0859
Copper	0.0177
Lead	0.0090
Mercury	0.0002
Nickel	<0.0080
Zinc	0.0602
Cyanide	0.2830
Chlorinated hydrocarbons	<0.0050

TECHNICAL PRODUCT BULLETIN #B-45
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: JANUARY 28, 1993
REVISED LISTING DATE: NOVEMBER 14, 1995
"SYSTEM E.T. 20"
(formerly MCW.B 20)

I.NAME, BRAND, OR TRADEMARK
System E. T. 20
Type of Product: Biological Additive

II.NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Quantum Environmental Technologies, Inc. (QET)
8096 La Jolla Scenic Drive North, Suite B
La Jolla, CA 92037
Phone: (619) 535-0664
Fax: (619) 535-1029
(Mr. Arne Van Roon, ext. 19)
(Mr. John Chase, ext. 16)

III.NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Quantum Environmental Technologies, Inc. (QET)
8096 La Jolla Scenic Drive North, Suite B
La Jolla, CA 92037
Phone: (619) 535-0664
Fax: (619) 535-1029
(Mr. Arne Van Roon)

IV.SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1.Flammability:

System E. T. 20 is non-flammable

2.Ventilation:

No special ventilation is required under normal use.

3.Skin and eye contact; protective clothing; treatment in case of contact:

In its primary form, no special handling or storage is required.

Avoid excessive inhalation, and protect the nose and mouth with a dust protection mask.

Wear protective gloves, and wash hands with soap and water after handling the product.

4.Optimum storage conditions:

Place in a dry area, shaded from sunlight, in a temperature range of 4 C to 20 C (39 to 68 F).

V.SHELF LIFE

2 years if maintained at 4 C (39 F).

SYSTEM E.T. 20

VI. RECOMMENDED APPLICATION PROCEDURE

System E. T. 20 is a blend of bacterial strains designed for a broad range of hydrocarbon compounds (including PAH's) found in open and closed water systems (salt or fresh) or in soil (beach sands or inland soil types). Accompanying these bacterial strains is an oleophilic, non-water soluble nutrient, which releases nitrogen and phosphorus, thus allowing System E. T. 20 to be used in water and soil applications including:

- Conditions requiring fast degradation rates due to regulations, limited space or cost;
- Conditions where weathered or heavy oils, sludges or PAH's exist that require consistently high populations of hydrocarbon degrading bacteria to metabolize these long or more complex carbon chains;
- Tropical or sub-tropical conditions that support large, indigenous, non-beneficial bacterial populations that would otherwise dilute the effectiveness of standard bioaugmentation approaches;
- Aqueous conditions in which soluble or time release nutrient compounds would be washed away or diluted, i.e., beaches, frequent rains, floods, streams, stream banks, estuaries and areas affected by tides;
- Sensitive environmental conditions that demand low or no toxicity; Toxicity in soil or water during bioremediation may be stimulated by adding broadly available nutrients which may activate disease carrying bacilli or pathogens. Controlled nutrient release to System E. T. 20 bacteria prevents over-nitrification;
- Conditions requiring the elimination of oil discoloration caused by the presence of polar fractions;
- Conditions where salt water conditions exist or where only salt water is available for bacteria application.

1. Application Methods:

Biopile	Land farm	Pump and Treat
Bio reactor	Bio slurry	
Insitu	Windrow	

Topical application to discolored rocks or soil

Topical application to beaches

2. Concentration/Application Rate:

Concentration and rate of application will vary from site to site depending upon the type of contaminant and the area contaminated. Contact QET for specific information.

3. Conditions for Use:

Before applying System E. T. 20, QET recommends that the site be evaluated for its physical and chemical soil characteristics (i.e., pH, salinity, conductivity, physical parameters, moisture content, hydrocarbon type and concentration, nitrogen content, etc.), and toxicity of both the soil and the contaminant, by biological screening tests.

Basic biological requirements of System E. T. 20, site conditions and System E. T. 20 capabilities dictate the appropriate procedures for application of System E. T. 20.

Biological requirements for System E. T. 20 bacteria are nutrients, adequate oxygen supply, hydrocarbon food source, neutral pH and a 15% minimum moisture level for soil remediation applications.

VII.EFFECTIVENESS

Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:
Summary Data Table

DAYS	PRODUCT	TOTAL MEAN	RED.%	TOTAL MEAN	RED.%
	3 REPLCTS/PROD.	ALKANE (ppm)	28 DAYS	AROMATIC S (ppm)	28 DAYS
0	CONTROL	29959.5	0	5391.8	0
	NUTRIENT	29008.5	0	5163.0	0
	SYSTEM ET 20	30476.1	0	5311.3	0
7	CONTROL	33471.3	0	5720.9	0
	NUTRIENT	22723.7	0	5050.1	0
	SYSTEM ET 20	3837.1	0	2928.8	0
28	CONTROL	30997.4	0	5383.9	0.2
	NUTRIENT	1103.9	96.2	4582.4	11.2
	SYSTEM ET 20	261.9	99.1	1188.0	77.0

Results of Gravimetric Analysis

Percentage (%) Decrease in Weight of Oil on Day 28

Control

0%

Nutrient

19%

Product (Stm ET 20)

18%

VIII.MICROBIOLOGICAL ANALYSIS

1.Listing of all microorganisms by species and percentage in the composition:

CONFIDENTIAL

2.Optimum pH, temperature, and salinity ranges for use of the additive:

pH: 7.5, (6.5 to 8.5)

Temperature: 4 C to 35 C (39 to 95 F)

Salinity: Fresh to 2.5% (average ocean salt level)

3.Minimum and maximum pH, temperature, and salinity levels below or above which the effectiveness of the additive is reduced to half its optimum capacity:

pH: <6.5 and >8.5

Temperature: <5 C and >35 C (<41 and >95 F)

Salinity: >3%

4.Special nutrient requirements:

Recommendation is for a non-soluble nutrient. The specific types of nutrients will be dependent on the site requirements.

SYSTEM E.T. 20

5. Test results regarding the determination of the presence of the following:

Salmonella: None

fecal coliform: None

Shigella: None

Staphylococcus coagulase positive: None

Beta hemolytic Streptococci: None

TECHNICAL PRODUCT BULLETIN #B-48
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: NOVEMBER 10, 1993
REVISED LISTING DATE: AUGUST 31, 2000
"BET BIOPETRO"
(formerly BET BIOPETRO HEAVY)

I. NAME, BRAND, OR TRADEMARK
BET BIOPETRO
Type of Product: Biological Additive

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
BioEnviroTech
14615 FM 2920
Tomball, Texas 77375
Phone: (281) 351-5594
Phone: (800) 758-3253
Fax: (281) 351-5494
(Mr. Warren Butler)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
BioEnviroTech
14615 FM 2920
Tomball, Texas 77375
Phone: (281) 351-5594
Fax: (281) 351-5494
(Mr. Warren Butler)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability: Non-Flammable
2. Ventilation: Normal ventilation
3. Skin and eye contact; protective clothing; treatment in case of contact:
Avoid eye and skin contact. In case of eye contact, flush eyes with water or eyewash, and refrain from rubbing. For skin contact, wash with mild soap and apply hand cream if itching or redness occurs. Avoid inhalation. In case of inhalation, seek fresh air. Repeated inhalation has been associated with respiratory allergy in some persons. Such allergic individuals should wear protective clothing and eye goggles. In enclosed buildings, workers should wear single use nuisance dust masks appropriate for fine particulate dust. In outdoor field applications, no dust mask is required.
- 4.a. Maximum storage temperature: 105°F
- b. Minimum storage temperature: 32°F
- c. Optimum storage temperature range: 50°F to 75°F

BET BIOPETRO

V. SHELF LIFE

More than 3 years in unopened original shipping container, stored in cool dry area.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method:

BET BioPetro is a powder containing granules of bacterial product formulated to provide performance in the bioremediation of heavy refined and crude hydrocarbon contaminants in both soil and water environments.

Application procedure and treatment schedule will vary with specific environmental conditions and bioremediation requirements. Contact BET for specific technical advice.

2. Concentration/Application Rate:

Dosage will vary with specific environmental conditions and bioremediation requirements. Contact BET for specific technical advice.

3. Conditions for Use:

BET BioPetro should be used at temperatures in the range of 45°F to 100°F, pH range of 5.5 to 8.5, and dissolved oxygen level of 3 to 5 mg/l. The product is effective in both salt and fresh waters.

However, where extreme salinity is projected, testing and evaluation of the bacteria in bioremediation are advised. BET BioPetro cultures exhibit some resistance to toxic shocks from strong chemicals. Nonetheless, highly chlorinated compounds, acids, caustics, disinfectants, germicides, and chlorine will render the cultures ineffective, just like other bacteria. Where such chemicals are anticipated, testing and evaluation of the bacteria in bioremediation are advised.

BET BioPetro cultures require supplemental nutrients for optimum performance (See section VIII d).

VII. EFFECTIVENESS:

Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:

Summary Data Table

DAYS	PRODUCT	TOTAL MEAN	RED.%	TOTAL MEAN	RED.%
	3 REPLCTS/PROD.	ALKANE (ppm)	28 DAYS	AROMATICS (ppm)	28 DAYS
0	CONTROL	29965.2	0	5620.5	0
	NUTRIENT	31494.8	0	6660.2	0
	BET BIOPETRO	25914.5	0	5569.1	0
7	CONTROL	30101.5	0	5610.1	0
	NUTRIENT	8073.9	0	5086.6	0
	BET BIOPETRO	373.0	0	1220.0	0

BET BIOPETRO

DAYS	PRODUCT	TOTAL MEAN	RED.%	TOTAL MEAN	RED.%
	3 REPLCTS/PROD.	ALKANE (ppm)	28 DAYS	AROMATICS (ppm)	28 DAYS
28	CONTROL	28785.6	4.0	5512.7	2.0
	NUTRIENT	706.2	98.0	4863.7	27.0
	BET BIOPETRO	350.3	99.0	1882.9	67.0

Results of Gravimetric Analysis

Percentage (%) Decrease in Weight of Oil on Day 28

Control	Nutrient	Product (BET BioPetro)
0%	51%	30%

VIII. MICROBIOLOGICAL ANALYSIS

a. Listing of all microorganisms by species and percentage in the composition: CONFIDENTIAL

b. Optimum pH, temperature, and salinity ranges for use of the additive

pH: 6.6 to 7.4

Temperature: 70°F to 95°F

Salinity: Fresh to Salt water

c. Minimum and maximum pH, temperature, and salinity levels below or above which the effectiveness of the additive is reduced to half its optimum capacity.

pH: <5.5 and >8.5

Temperature: <45°F and >105°F

Salinity: Extreme salinity

d. Special nutrient requirements

BioEnviroTech, Inc. recommends nutrient supplements for optimum performance of the product in bioremediation application. The required nutrients are dependent upon hydrocarbon contamination levels. Contact BET for specific nutrient dosing requirements.

e. Test results regarding the determination of the presence of the following:

Salmonella: None found

Fecal coliform: None found

Shigella: None found

Staphylococcus coagulase positive: None found

Beta hemolytic Streptococci: None found

BET BIOPETRO

TECHNICAL PRODUCT BULLETIN #B-52
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: SEPTEMBER 27, 1994
REVISED LISTING DATE: FEBRUARY 2, 1996
"ENZYT (LIQUID/CRYSTAL)"

I.NAME, BRAND, OR TRADEMARK
ENZYT (LIQUID/CRYSTAL)
Type of Product: Biological Additive

II.NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Acorn Biotechnical Corporation
P.O. Box 925521
Houston, Texas 77292
Phone: (713) 861-6087
Fax: (713) 861-6032
(Dr. Kenneth O. Madsen)

III.NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Acorn Biotechnical Corporation
P.O. Box 925521
Houston, Texas 77292
Phone: (713) 861-6087
Fax: (713) 861-6032
(Dr. Kenneth O. Madsen)

IV.SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1.Flammability:

Non-Flammable

2.Ventilation:

Normal or well ventilated work area is recommended.

3.Skin and eye contact; protective clothing; treatment in case of contact:

The product is suitable for treating wastes which can be disposed of in Class I (RCRA) landfills. As such, general personal hygiene applicable for handling these wastes is recommended when applying this product in treating these wastes, or the product alone.

For personal protection, wear eye safety goggles, impermeable gloves and protective boots.

Avoid contact with skin and eyes. In case of contact with skin or eye, wash the affected part thoroughly with water. There are no special safeguards or reentry requirements after use of the product.

4.a.Maximum storage temperature: 160F (Liquid product), 176F (Crystal product)

b.Minimum storage temperature: 33F (Liquid product), -76F (Crystal product)

c.Optimum storage temperature range: 50F to 113F

ENZYT (LIQUID/CRYSTAL)

V.SHELF LIFE

1 year minimum in an unopened container

VI.RECOMMENDED APPLICATION PROCEDURE

1.Application Method:

For soil treatment, dilute 0.5 gallons of ENZYT LIQUID in 4 gallons of water. Or suspend 1.5 lbs of ENZYT CRYSTAL in 5 gallons of water. Apply the product/water solution per cubic yard of contaminated soil where total petroleum hydrocarbon (TPH) is 100,000 ppm or less.

At contamination levels above 50,000 ppm total petroleum hydrocarbon, repeated application may be necessary. Keep soil slightly damp by irrigating as necessary.

For water treatment, mix 0.5 gallons of ENZYT LIQUID with 600 gallons of contaminated water, or dissolve 1.5 lbs of ENZYT CRYSTAL per 600 gallons of contaminated water, where total petroleum hydrocarbon is 100,000 ppm or less.

At contamination levels above 50,000 ppm total petroleum hydrocarbon, repeated application may be necessary.

Duration of treatment may last for about three months, depending upon the contamination level.

Usually, degradation of hydrocarbon begins immediately as soon as the product is applied to the remediation site, and will continue until all hydrocarbon has been consumed.

2. Concentration/Application Rate:

See in method of application above.

3.Conditions for Use:

The product can be used to treat any non-chlorinated hydrocarbon, irrespective of the age of the pollutant.

Salinity of contaminated water should not be greater than 6% dissolved salts, and the treatment temperature range should be between 54F and 113F.

VII.EFFECTIVENESS:

Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:
Summary Data Table

DAYS	PRODUCT	TOTAL MEAN	RED.%	TOTAL MEAN	RED.%
	3 REPLCTS/PROD.	ALKANE (ppm)	28 DAYS	AROMATIC S (ppm)	28 DAYS
0	CONTROL	2203.3	0	1913.3	0
	NUTRIENT	2246.7	0	1983.3	0
	ENZYT	2270.0	0	1876.7	0
7	CONTROL	2320.0	0	-71913.3	0
	NUTRIENT	2233.3	0	1866.7	0

ENZYT (LIQUID/CRYSTAL)

DAYS	PRODUCT	TOTAL MEAN	RED.%	TOTAL MEAN	RED.%
	3 REPLCTS/PROD.	ALKANE (ppm)	28 DAYS	AROMATIC S (ppm)	28 DAYS
	ENZYT	2213.3	0	2126.7	
28	CONTROL	2263.3	-2.7	2413.3	-26.1
	NUTRIENT	1826.7	18.7	1883.3	-0.9
	ENZYT	1666.7	26.6	1913.3	-2.0

Results of Gravimetric Analysis

Percentage (%) Decrease in Weight of Oil on Day 28

Control	Nutrient	Product (ENZYT)
0.0%	15.0%	26.0%

VIII.MICROBIOLOGICAL ANALYSIS

a.Listing of all microorganisms by species and percentage in the composition

CONFIDENTIAL

b.Optimum pH, temperature, and salinity levels below or above which the effectiveness of the additive is reduced to half its optimum capacity.

pH: 6.5 - 8.5

Temperature: 54F - 113F (for soil treatment, not <50F)

Salinity: 0% - 6%

c.Minimum and maximum pH, temperature, and salinity levels below or above which the effectiveness of the additive is reduced to half its optimum capacity.

pH: 9.0, 5.5

Temperature: >113F, <50F

Salinity: >6%

d.Special nutrient requirements

Nitrogen level of 0.0266 times the TPH concentration.

Phosphorus level of 0.0037 times the TPH concentration.

e.Test results regarding the determination of the presence of the following:

Salmonella: None found

fecal coliform: None found

Shigella: None found

Staphylococcus coagulase positive: None found

Beta hemolytic Streptococci: None found

ENZYT (LIQUID/CRYSTAL

TECHNICAL PRODUCT BULLETIN #B-53
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: AUGUST 26, 1996
"OIL SPILL EATER II (OSE II)"

I. NAME, BRAND, OR TRADEMARK

OIL SPILL EATER II (OSE II)

Type of Product: Nutrient Additive/Enzyme Additive

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER

Oil Spill Eater International, Corporation

13127 Chandler Drive

Dallas, TX 75243

Phone: 972-669-3390

Fax: 972-644-8359

(Mr. O.A. Lively)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

Oil Spill Eater International, Corporation

13127 Chandler Drive

Dallas, TX 75243

Phone: 972-669-3390

Fax: 972-644-8359

(Mr. O. A. Lively)

Marketing Rep.

9551 Arlene

Anchorage, AK 99515

Phone: 907-272-4524

(Mr. Steve Karcz)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability:

Non-flammable; water-based

2. Ventilation:

Needs no ventilation; does not emit hazardous vapors

3. Skin and eye contact; protective clothing; treatment in case of contact:

OSE II is not a primary dermal irritant, but the concentrate has a potential for irritation. Caution is suggested; however, tests have shown that OSE II is virtually non-irritating. Facilities for quick and copious water flushing should be provided. OSE II once mixed at either specified application ratio becomes virtually non-irritating. Protective rubber gloves are suggested during handling, but are not required.

The product, in concentrated form, could be an ocular irritant; adequate protection, such as chemical goggles, is suggested against eye exposure. Facilities for instant and copious water flushing should be provided and prompt medical attention should be sought if exposure and irritation persists. OSE II mixed at either specified application ratio becomes virtually non-irritating.

The product, in concentrated form, has a smell of fermentation. The product does not give off any harmful vapors and is virtually non-irritating during inhalation tests.

OSE II

- 4.a.Maximum storage temperature: 120F
- 4.b.Minimum storage temperature: None; product can freeze and thaw without adverse effects.
- 4.c.Optimum storage temperature range: 72F
- 4.d.Temperatures of phase separations and chemical changes: 120F

V.SHELF LIFE

OSE II has a shelf life of five (5) years when properly stored. After 5 years at optimum storage temperatures, there is a 10% decrease per year in product capabilities.

VI. RECOMMENDED APPLICATION PROCEDURE

1.Application Method:

a.Surface Spray

b.Eductor System set at 1% or 2% depending on the type of hydrocarbon or organic contaminant spill.

2.Concentration/Application Rate:

For crude oil and weathered asphaltenes, dioxins, PCBs, or other organic contaminants, use OSE II at a mixture of 50 gallons of fresh or ocean water to 1 gallon of OSE II concentrate and apply at a rate of 1 gallon of diluted OSE to 1 gallon of crude oil. One gallon of OSE II will make 51 gallons of a product that will mitigate 50 gallons of crude oil.

For light end hydrocarbons or BETX, use OSE II at a mixture of 100 gallons of fresh or ocean water to 1 gallon of OSE II concentrate and apply at a rate of 1 gallon of diluted OSE to 1 gallon of spilled light end hydrocarbons or BETX. One gallon of OSE II will make 101 gallons of diluted product that will mitigate 101 gallons of light end hydrocarbons or BETX.

OSE II can be used from pure concentrate to a ratio of 1/1000.

Contact the manufacturer for complete instructions, calculations, mixing and application rates for specific contaminants.

3.Conditions for Use:

Variations of sea water salinity may have a slight effect, but as long as microbial life can exist, the effect will be minimal.

Water temperature: OSE II bioremediation slows at temperatures below 40F. OSE II, however, will continue to work at any liquid water temperature that will sustain microbial life.

Types and ages of pollutants: Mixing ratio depends on type of pollutant. (See VI, above). As the age of spilled hydrocarbons increases, the time necessary for bioremediation increases.

In general, fresh crude, gasoline or BETX takes from 48 hours to thirty (30) days to completely bioremediate to CO₂ and water.

Test have proven OSE II will biodegrade Dichlorobenzene, Dioxins, PCBs, PCPs, Styrene Co-Polymer, DDT and all insecticides.

OSE II should prove to bioremediate various toxic wastes and any organic wastes or any organic based contaminant.

VII.a.EFFECTIVENESS

Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:
Summary Data Table

DAYS	PRODUCT	TOTAL MEAN	RED.%	TOTAL MEAN	RED.%
	3 REPLCTS/PROD.	ALKANE (ppm)	28 DAYS	AROMATIC S (ppm)	28 DAYS
0	CONTROL	2203.3	0	1913.3	0
	NUTRIENT	2246.7	0	1983.3	0
	OSE II	N/A	0	N/A	0
7	CONTROL	2320.0	0	-71913.3	0
	NUTRIENT	2233.3	0	1866.7	0
	OSE II	N/A	0	N/A	0
28	CONTROL	2263.3	-2.7	2413.3	-26.1
	NUTRIENT	1826.7	18.7	1883.3	-0.9
	OSE II	N/A	N/A	N/A	N/A

Results of Gravimetric Analysis

Percentage (%) Decrease in Weight of Oil on Day 28

Control	Nutrient	Product (OSE II)
0.0%	15.0%	8.0%

b. TOXICITY

MATERIAL TESTED	SPECIES	LC50 (ppm)
OSE II	Menidia beryllina	57.58 96-hr
	Mysidopsis bahia	152.00 48-hr
No. 2 Fuel Oil	Menidia beryllina	6.72 96-hr
	Mysidopsis bahia	8.71 48-hr
OSE II & No. 2 Fuel Oil (1:10)	Menidia beryllina	4.63 96-hr
	Mysidopsis bahia	7.61 48-hr
Reference toxicant (DSS)	Menidia beryllina	12.5 96-hr
	Mysidopsis bahia	20.0 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

VIII.MICROBIOLOGICAL ANALYSIS

OSE II is a nutrient enhancement product with nitrogen, phosphorus and readily available carbon and

OSE II

vitamins for quick colonization of naturally occurring bacteria.

1.Listing of all microorganisms by species and percentage in the composition:

None.

2.Optimum pH, temperature, and salinity ranges for use of the additive

pH:7.0 (Range of 3.5 - 8.0)

temperature:72F (Range of 28F - 120F)

salinity:Fresh to seawater.

Salinity level to which effectiveness is reduced to half its optimum capacity.

a.Salinity does not adversely affect OSE II's performance.

b.Salinity level above the level that will support normal microbial activity will adversely affect OSE II's performance.

3.Specific Gravity

1.05 - Virtually the same as water.

4.Special nutrient requirements

None required.

5.Test results regarding the determination of the presence of the following:

Salmonella:Not applicable

fecal coliform:Not applicable

Shigella:Not applicable

Staphylococcus coagulase positive: Not applicable

Beta hemolytic Streptococci: Not applicable

TECHNICAL PRODUCT BULLETIN #B-54

USEPA, OIL PROGRAM CENTER

ORIGINAL LISTING DATE: 6/28/99

REVISED LISTING DATE:

"PRISTINE SEA II"

I.NAME, BRAND, OR TRADEMARK

PRISTINE SEA II/Formerly listed as MICROPRO D

Type of Product: Bioremediation Agent (Biological Additive)

II.NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

Marine Systems

6149 North Shore Drive

Baton Rouge, LA 70817

Phone: (225) 755-7711

Mobile: (225) 802-8071

(Dr. Clayton R. Page, III, Ph.D.)

Marine Systems

4335 West Tropicana, Suite 3

Las Vegas, NV 89103-5413

Phone: (702) 871-1884

(Mr. Stan True)

III.NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

Marine Systems

6149 North Shore Drive

Baton Rouge, LA 70817

Phone: (225) 755-7711

Mobile: (225) 802-8071

(Dr. Clayton R. Page, III, Ph.D.)

Marine Systems

4335 West Tropicana, Suite 3

Las Vegas, NV 89103-5413

Phone: (702) 871-1884

(Mr. Stan True)

IV.SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1.Flammability:

PRISTINE SEA II is non-flammable.

2.Ventilation:

Provide adequate ventilation in enclosed areas. Avoid creating dust.

3.Skin and eye contact:

In case of eye or skin contact, flush affected areas thoroughly with water. Wear protective gloves, safety glasses, and dust respirators in dusty conditions. Provide eye wash facility and washing area. Exercise reasonable personal cleanliness.

4.a.Maximum storage temperature: 48C

b.Minimum storage temperature: 6C

c.Optimum storage temperature range: 24C-30

d.Temperatures of phase separations and chemical changes: Not Applicable

V.SHELF LIFE

As a dry bacterial blend, the shelf life is 1 year, and as a liquid bacterial mixture, the shelf life is 6

PRISTINE SEA II

months.

VI.RECOMMENDED APPLICATION PROCEDURE

1.Application Method:

Soak at a rate of 1 kg to 4 L influent waste and 4 L tap water, or add directly to system.

2.Concentration/Application Rate:

Product dosage will vary according to contaminant, matrix, and environmental conditions. Contact technical representatives for recommendations.

3.Conditions for Use:

Pristine Sea II can be used to treat (degrade) refinery and petrochemical waste constituents (i.e., alkanes and aromatics) such as phenol, PAHs, cresols, paraffinic intermediates, sulfides, alcohols, and related solvents. The product also improves settling and minimizes foam formation and/or production.

VII. a.EFFECTIVENESS

PRISTINE SEA II is expected to be effective in the degradation of refinery and petrochemical wastes. These bioremediation test results are provided by EPA's Risk Reduction Laboratory, Cincinnati, Ohio.

DAYS	PRODUCT	RED. %
11	CONTROL	28
	ALKANE	93.6
	AROMATIC	86
20	CONTROL	26
	ALKANE	95.5
	AROMATIC	90

b.TOXICITY

Not Applicable.

VIII.MIROBIOLOGICAL ANALYSIS

Confidential.

IX.PHYSICAL PROPERTIES

Not Applicable.

X.ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Not Applicable.

PRISTINE SEA II

TECHNICAL PRODUCT BULLETIN B-55
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: 9/10/99
"LAND AND SEA RESTORATION PRODUCT 001 (VELITE)"

I. NAME, BRAND, OR TRADEMARK

"Land and Sea Restoration Product 001 (Velite)"
Type of Product: Bioremediation Agent (Nutrient Additive)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

Land and Sea Restoration LLC
4147 Acorn Hill
San Antonio, TX 78217
Phone: (210) 650-5556
Fax: (210) 650-5567
(T. Shawn Parker)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

Land and Sea Restoration LLC
4147 Acorn Hill
San Antonio, TX 78217
Phone: (210) 650-5556
Fax: (210) 650-5567
(T. Shawn Parker)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability: Flash Point 250°C (482°F)
2. Ventilation: Normal ventilation
3. Skin and eye contact: Protective clothing and glasses. In case of eye contact, flush eyes with water or eyewash and refrain from rubbing. For skin contact, wash with mild soap and apply cream if itching or redness occurs. Avoid inhalation. In case of inhalation, seek fresh air. Wear protective clothing and eye goggles. Workers should wear single use nuisance dust masks appropriate for fine particulate dust.
4. a. Maximum storage temperature: 65°C (150°F)
b. Minimum storage temperature: 0°C (32°F)
c. Optimum storage temperature range: 0 to 65°C (32 to 150°F)
d. Temperatures of phase separations and chemical changes: NA

V. SHELF LIFE

More than 5 years in unopened original shipping container, store in a cool, dry place. Avoid moisture prior to use.

LAND AND SEA RESTORATION
PRODUCT 001

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method: On water, spread over contaminated area at 1 to 3 ratios. On soil, blend to depth equivalent to contamination level. On hard surfaces, spread over contaminated area. Make sure the spill is completely absorbed. For best results agitate with broom. (Will not damage cured asphalt if used as an absorbent for spills.) Remove and dispose of in accordance with all state and federal laws, after absorption is complete.
2. Concentration/Application Rate: 1 part 001 to 3 parts hydrocarbon.
3. Conditions for Use: NA

VII. TOXICITY AND EFFECTIVENESS

DAYS	PRODUCT	TOTAL MEAN	RED.%	TOTAL MEAN	RED. %
	3 REPLCTS/PROD.	ALKANE (ppm)	28 DAYS %	AROMATICS (ppm)	28 DAYS %
0	CONTROL	13.8239	0	0.0443	0
	001	13.5856	0	0.0509	0
7	CONTROL	14.3292	0	0.0473	0
	001	10.1005	29.52	0.0437	0
28	CONTROL	14.4675	0	0.0401	0
	001	8.2629	42.92	0.0273	31.92

Results of Gravimetric Analysis

Percentage (%) Decrease in Weight of Oil on Day 28

Control	Product (001)
0%	25.18%

VIII. MICROBIOLOGICAL ANALYSIS

1. Listing of all microorganisms by species and percentages in the composition:

CONFIDENTIAL

2. Optimum pH, temperature, and salinity ranges for use of the additive:

pH: 6 to 8

Temperature: 25 to 30°C (77°F to 86°F)

Salinity: Fresh to salt

3. Minimum and maximum pH, temperature, and salinity levels below or above which the effectiveness of the additive is reduced to half its optimum capacity:

LAND AND SEA RESTORATION
PRODUCT 001

pH: Not applicable

Temperature: Not applicable

Salinity: Not applicable

4. Special nutrient requirements:

The product "001" is a nutrient, therefore no nutrients are required.

5. Test results regarding the determination of the presence of the following:

Salmonella sp: Negative

Fecal Coliform/MPN: <3

Shigella: Negative

Staphylococcus aureus/g: <10

Streptococcus/g: 1,100

IX. PHYSICAL PROPERTIES

1. Flash Point: 250°C (482°F)

2. Pour Point: Not applicable

3. Viscosity: Not applicable

4. Specific Gravity: Not applicable

5. pH: Not applicable

6. Surface Active Agents: Not applicable

7. Solvents: Not applicable

8. Additives: Not applicable

9. Solubility in Water: Not applicable

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Not Applicable

TECHNICAL PRODUCT BULLETIN #M-12
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: AUGUST 31, 1992
REVISED LISTING DATE: SEPTEMBER 13, 1995
"PES-51"

I.NAME, BRAND, OR TRADEMARK

PES-51

Type of Product: Miscellaneous Oil Spill Control Agent

II.NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

Practical Environmental Solutions (Formerly known as Petroleum Environmental Services)

P.O. Box 12563

San Antonio, Texas 78212

Phone: (210) 822-4205

Fax: (210) 822-4205

(Mr. Dennis C. Owens)

III.NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

FOSS Environmental Services

(various locations include):

WASHINGTON

Seattle	(206) 281-3800
Tacoma	(206) 272-0362
Port Angeles	(360) 457-3688
Everett	(206) 252-4131
Grays Harbor	(360) 532-4445
FOSS Envrnmt'l	(206) 767-0441
FOSS Shipyard	(206) 281-3872
FOSS Terminal	(206) 281-3754

CALIFORNIA

Los Angeles/	
Long Beach	(310) 435-0171
San Francisco	
Bay	(707) 745-4747
San Diego	(619) 234-8228
FOSS Envrnmt'l	(310) 432-1304

OREGON

Portland	(503) 286-0631
Astoria	(503) 325-6621
Rainier	(503) 556-4311
FOSS Envrnmt'l	(503) 283-1150

ALASKA

Anchorage	(907) 274-1577
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CANADA

Vancouver	(604) 665-4363
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IV.SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1.Flammability: 124F

2.Ventilation: Handle product in a normal well ventilated place.

3.Skin and eye contact; protective clothing; treatment in case of contact:

Although PES-51 is expected not to pose any specific health hazard, the following precautions are

recommended due to possible irritation from the biological by-products contained in the product:

Avoid contact with skin, eyes, and clothing.

Avoid prolonged or repeated contact with skin, breathing mist, and do not take internally.

Keep product away from heat, sparks, and flames, and store in a cool, dry, well ventilated place, away from incompatible materials.

Vent container in warm weather to relieve pressure.

Do not cut, grind, weld or drill on or near product containers.

Handle empty containers just as would the full ones.

4.a.Maximum storage temperature: Not applicable.

4.b.Minimum storage temperature: Not applicable.

4.c.Optimum storage temperature range: Not applicable.

4.d.Temperatures of phase separations and chemical changes: Not applicable, but PES-51 freezes at -142F.

V.SHELF LIFE

6 years (unopened drum), 1 year (opened drum).

VI.RECOMMENDED APPLICATION PROCEDURE

1.Application Method:

The following PES-51 application methods are applicable for the full range of PES-51 industrial uses, including shoreline and surface treatment, tank cleaning and equipment decontamination. The selection of the method(s) will be dependent on the level and extent of hydrocarbon contamination, type of oil, and its degree of weathering/emulsion and the nature and type of surface to be treated or cleaned. Equipment availability, logistics and manpower requirements should also be considered. Application methods may be combined, if necessary. In addition, for shoreline cleaning, the treatment area will be boomed and contained prior to PES-51 usage. For equipment decontamination, the use of portable decon pools or secondary containment liners are recommended.

PORTABLE EQUIPMENT

A.Hand Held Spraying

Spray PES-51 on the contaminated area using a Chapin Steel Sprayer #1729 (or equivalent), 2.5 gallons capacity, or the AU 8000 MicroNair sprayer. After application, allow 3 to 5 minutes for soaking without allowing evaporation of PES-51 (weather dependent). When saturation is attained, hydrocarbon will be seen running off the impacted surface.

Rinse the treated surface with available water (fresh or sea water) from the pump until no hydrocarbon remains. The water should be used at ambient temperature. Depending on level and extent of contamination, a pressure washer may also be used for rinsing (ambient may be used).

Collect the effluent hydrocarbons with absorbent booms and pads, and squeeze off the oil contaminants from the booms and pads for reuse as process oil.

B.Airless Sprayer

Depending on the level and extent of the hydrocarbon contamination and the nature of the impacted surface, an airless type sprayer may be used for direct product application. Common types of airless sprayers are: Airlessco, Graeco or equivalents. These airless sprayers can have single or multi-hose attachments and can include wand extensions as required. Application rate and pressure will vary

depending on the equipment type and site specific conditions.

After spraying with PES-51, allow to soak for 3 to 5 minutes (weather dependent) avoiding evaporation, rinse/flush surfaces with pumps, fire hoses, deluge headers or pressure washers (ambient).

C. Pressure Washer with Syphon Feed System

Depending on the level and extent of the hydrocarbon contamination and the nature of the impacted surface proposed for treatment, a pressure washer may be used for direct product application. In most applications, hot water (greater than 120 oF) is not necessary. Common types of pressure washers are: Hotsy and Lambda, or equivalents. These pressure washers have a variable rate "detergent syphon feed" system for PES-51 application and can have single or multi-hose attachments which can include wand extensions. Application rate and pressure will vary depending on equipment type and site specific conditions.

After spraying with PES-51, allow to soak for 3 to 5 minutes (weather dependent) avoiding evaporation, rinse/flush surfaces with pumps, fire hoses, deluge headers or pressure washers (ambient).

D. Air Knife (Modified for PES-51 Application)

PES has developed a patent-pending modified air knife system for product application. This method was developed primarily for rocky, cobble, bedrock type shorelines with both surface subsurface oil. The modified air knife delivers the PES-51 in both a liquid stream (125 psi) or as an aerosol. Compressed air is used to dilate subsurface sediments and allow for distribution of the PES-51. The air knife method is also applicable for surface treatment of impacted rocks, bulkheads, seawalls, rip-rap jetties, etc.

After spraying with PES-51, allow to soak for 3 to 5 minutes (weather dependent) avoiding evaporation, rinse/flush surfaces with pumps, fire hoses, deluge headers or pressure washers (ambient). For subsurface treatment, continue flushing with large quantities of low-pressure seawater at ambient temperatures.

MOBILE EQUIPMENT

A. Boat Spraying

The recommended application rate is 1 to 5 gallons per 200 sq. ft., from a boat with speed of 1 to 3 knots, depending on the sea conditions and oil film thickness on the rocks. For a boat with a mounted AU-8110 MicroNair sprayer (or equivalent sprayer) and a spray swath of about 20 feet, travelling at approximately two knots, 25 acres/hr will be treated.

After spraying, rinse PES-51 off the rocks with a hard, coarse spray of sea water. Standard size pumps with fire hoses or deluge headers may be used. Higher pressure rinses may be required if oil is thick and weathered. The shoreline may also be sprayed from the beach side, which will force the oil into the containment boom.

B. Helicopter Deployed Spraying

Aerial spraying can be utilized for shore treatments and pretreatment with the AU 5000 atomizer (MicroNair) or equivalent sprayer.

The recommended aerial application of PES-51 is 14 to 23 liters/minute. The AU 5000 (or equivalent) can be used with fixed-wing aircraft and helicopters operating at speeds of 90 MPH (145 Km/Hr) and more. The smaller AU 7000 sprayer (or equivalent) is recommended for use at airspeeds below 90 MPH.

After spraying, the hydrocarbons can be rinsed off the shore rocks as described above with hand held pumps, deluge headers or boat spraying.

C.Vehicular Spraying

The recommended vehicular spraying is 50 to 150 ft²/gallon depending on climatic conditions. A MicroNair vehicle-mounted sprayer is recommended. This unit is a self contained sprayer kit that combines the AU 8000 sprayhead (or equivalent) with a powerful 4-stroke engine and a 60 liter chemical tank to give complete product coverage.

After spraying, the hydrocarbons can then be rinsed off the shore rocks as described above with hand held pumps, deluge headers or boat spraying.

2.Concentration/Application Rate:

The product comes already mixed, and ready for use.

For specific application, see rate of application as indicated above.

3.Conditions for Use:

Water temperature and salinity do not effect the product performance. PES-51 is effective against hydrocarbons only, and the age of the hydrocarbon is not relevant.

VII.TOXICITY AND EFFECTIVENESS

1.Toxicity:

Material tested	Species	LC50 (ppm)
PES-51	Menidia beryllina	137.00 96-hr
	Mysidopsis bahia	54.00 48-hr
No. 2 Fuel Oil	Menidia beryllina	200.00 96-hr
	Mysidopsis bahia	11.50 48-hr
PES-51 &	Menidia beryllina	435.00 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	14.50 48-hr
Reference Toxicant (DSS)	Menidia beryllina	2.20 96-hr
	Mysidopsis bahia	9.80 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

2.Effectiveness:

Not applicable.

IX.PHYSICAL PROPERTIES

1.Flash Point: 124F

2.Pour Point: -50F at 30 min.

3.Viscosity: 30 cst at 28C

4.Specific Gravity: 0.840 at 25C

5.pH: 6.7

6.Chemical Name and Percentage by Weight of the Total Formulation: CONFIDENTIAL

7.Surface Active Agents: CONFIDENTIAL

8.Solvents: CONFIDENTIAL

9.Additives: CONFIDENTIAL

10.Solubility: Not Applicable

X.ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	< 0.005
Cadmium	< 0.01
Chromium	< 0.05
Copper	< 0.05
Lead	< 0.05
Mercury	< 0.005
Nickel	< 0.01
Zinc	< 0.05
Cyanide	< 1.00
Chlorinated Hydrocarbons	< 0.01

TECHNICAL PRODUCT BULLETIN #M-17
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: FEBRUARY 25, 1994
REVISED LISTING DATE: JUNE 14, 1995
"CHEAP INSURANCE"

I.NAME, BRAND, OR TRADEMARK
CHEAP INSURANCE (formerly PETRO-CAPTURE)
Type of Product: Miscellaneous Oil Spill Control Agent

II.NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
OnSite Waste Management
3015 Winchester Acres, Rd.
P.O. Box 7427
Louisville, KY 40257-0427
(502) 241-1996
(800) 255-6073
FAX: (502) 899-5293
(Mr. Dan Parker)

III.NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
OnSite Waste Management
3015 Winchester Acres, Rd.
P.O. Box 7427
Louisville, KY 40257-0427
(502) 241-1996
(800) 255-6073
FAX: (502) 899-5293
(Mr. Dan Parker)

IV.SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

- 1.Flammability: Flammable solid at >210F.
- 2.Ventilation: Normal ventilation is adequate.
- 3.Skin and eye contact; protective clothing; treatment in case of contact:
Product may cause slight eye irritation if in contact with eyes. Use protective eye goggles when handling the product. In case of eye contact, flush eyes with water. In an enclosed environment, workers should wear a dust mask for personal comfort.
In case of a confined space fire, do not enter without full bunker gear and positive pressure NIOSH approved self-contained breathing apparatus.
Maintain fire watch at 450F.
- 4.a.Maximum storage temperature: 190F
b.Minimum storage temperature: None

CHEAP INSURANCE

c. Optimum storage temperature range: 50F - 80F

d. Temperatures of phase separations and chemical changes: None

Avoid contact with strong oxidizing agents due to possible oxidation reaction with the product.

V. SHELF LIFE

> 5 years, if stored in cool dry area, away from direct sunlight.

VI. RECOMMENDED APPLICATION PROCEDURES

1. Application Method:

For small scale spills on water (salt or fresh), CHEAP INSURANCE can be broadcast directly onto the spill, spreading a thin layer from the outer edge into the middle of the spill. Agitation is not necessary. The product is also available in oil absorbent, water repellant booms and pillows.

For large spills on water (fresh or salt), CHEAP INSURANCE may be deployed with an air or water stream directed at the leading edge of the spill. Because of its fine particulate nature, static buildup may occur if the product is applied in dry form at a high rate of delivery. Dispensing material should be properly grounded to prevent this. The product is relatively non-abrasive and should not harm machinery or pumping systems. Agitation is not necessary.

The polymer has a specific gravity of less than one and will tend to separate and move to the surface when mixed with water. Therefore, in the case of water carrying media, the product should be introduced "just in time" as the media is sprayed, or agitation will be needed to keep the product suspended.

The product will remove oils and other hazardous hydrocarbon based materials from fresh or salt water. CHEAP INSURANCE may be used in a flow-through filter to remediate contaminated water.

CHEAP INSURANCE encapsulates and solidifies the oil, while continuing to float even after saturation. The solidified oil or hazardous material may be removed from water using a vacuum pump or fish net. The material should be put into appropriate containers and disposed of in accordance with federal, state and local regulations.

For spills on land, the product would be applied in the same manner as in the water-based spill situation. Agitation is not necessary.

To recover solidified oil or hazardous materials from spills on land, the spent material may be collected and swept up using an industrial vacuum cleaner, broom, or shovel. The material should be put into appropriate containers and disposed of in accordance with federal, state and local regulations.

2. Concentration/Application Rate:

In general, a 10% to 30% by weight application is required to solidify light, medium, and heavy oils. Solidification may occur faster if additional CHEAP INSURANCE is applied.

3. Conditions for Use:

CHEAP INSURANCE is equally effective in fresh or salt water, and under any weather conditions; however, colder temperatures may slow the solidification process. The product is most effective on water temperatures between 32F and 120F.

Depending on the age and/or viscosity of the material, varying amounts of CHEAP INSURANCE may be required to obtain complete solidification.

The recovered solidified oil or hazardous materials may be landfilled, incinerated, used as a secondary fuel, or otherwise disposed of according to federal, state and local regulations.

CHEAP INSURANCE

VII.a.TOXICITY

Material Tested	Species	LC50 (ppm)
CHEAP INSURANCE	Menidia beryllina	2227 96-hr
	Mysidopsis bahia	2617 48-hr
No. 2 Fuel Oil	Menidia beryllina	4.36 96-hr
	Mysidopsis bahia	1.45 48-hr
CHEAP INSURANCE and No. 2 Fuel (1:10)	Menidia beryllina	5.93 96-hr
	Mysidopsis bahia	1.73 48-hr
Reference Toxicant (DSS)	Menidia beryllina	3.68 96-hr
	Mysidopsis bahia	6.82 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

IX.PHYSICAL PROPERTIES AND COMPONENTS

- 1.Flash Point: No flash observed at 210F.
- 2.Pour Point: Not applicable; solid samples
- 3.Viscosity: Not applicable; solid samples
- 4.Specific Gravity: 0.94 g/cm³
- 5.pH: 10.0 (5% solution at ambient temperature (ASTM-70)
- 6.Chemical Name and Percentage by Weight of the Total Formulation.
Confidential
- 7.Surface Active Agents: None
- 8.Solvents: None
- 9.Additives: None
- 10.Solubility: Negligible

X.ANALYSIS FOR HEAVY METALS AND CHLORINATED HYDROCARBONS

COMPOUND	CONCENTRATION (ppm)
Arsenic	<1.0
Cadmium	<2.5
Chromium	<2.0
Copper	<2.5
Lead	<5.0
Mercury	<0.050
Nickel	<5.0
Zinc	<2.5
Cyanide	<0.50
Chlorinated Hydrocarbons	None

CHEAP INSURANCE

TECHNICAL PRODUCT BULLETIN #M-18
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: MARCH 29, 1994
REVISED LISTING DATE: MARCH 12, 1997
"ZYME-FLOW"
(a/k/a ZYME-TREAT, MARI-ZYME, UNITED 658 PETRO-ZYME)

I.NAME, BRAND, OR TRADEMARK
ZYME-FLOW
Type of Product: Miscellaneous Oil Spill Control Agent

II.NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
United Laboratories, Inc.
320 37th Avenue
St. Charles, IL 60174
Phone: (630)377-0900 / (800) 323-2594
Fax: (630) 377-0960
(Ms. Nancy Suh)

III.NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
United Laboratories, Inc.
320 37th Avenue
St. Charles, IL 60174
Phone: (630) 377-0900 / (800) 323-2594
Fax: (630) 377-0960
(Ms. Nancy Suh)

IV.SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

- 1.Flammability:
Non-flammable
- 2.Ventilation:
No mechanical ventilation required
- 3.Skin and eye contact; protective clothing; treatment in case of contact:
Avoid eye contact due to possible mild eye irritation. In case of eye contact, flush eyes with water.
Protective clothing is normally not required.
- 4.a.Maximum storage temperature: 120F
- 4.b.Minimum storage temperature: 0F
- 4.c.Optimum storage temperature range: 0F - 120F
- 4.d.Temperatures of phase separations and chemical changes: > 3 freeze-thaw cycles.

V.SHELF LIFE
1 year minimum.

ZYME-FLOW

VI.RECOMMENDED APPLICATION PROCEDURE

1.Application Method:

United's Zyme-Flow is a chemically designed product that will make heavy crudes more pumpable, and break the adhesion between oils and soil, rock or sand.

Zyme-Flow can be applied where the contaminated soil or sand is temporarily removed and placed into a device that can provide mechanical agitation (e.g., a cement mixer or a fractionating tank). Unagitated tanks may also be used, but more time will be required to achieve the goal.

Add Zyme-Flow solution to the tank. As agitation continues, oils with a specific gravity of less than one will float, while oils with a specific gravity of greater than one will settle.

The floating or settled oil can then be removed from the soil or sand. As Zyme-Flow will not emulsify oils, the recovered oils are almost anhydrous, and the water can be collected and reused.

Another method is to physically isolate a small area that is to be cleaned with damming collars, sand bags or other means on the sides and a none permeable layer on the bottom (if possible). Then wash the contaminated area with Zyme-Flow solution using a pressurized water stream. Keep the area super-saturated with water for several hours to allow oil residues to float to the surface for collection.

Zyme-Flow can be used to wash the inside or outside of a ship or barge that has been contaminated with oil, using a high pressure sprayer. Bilges of a ship, or barge can also be cleaned using a 1% Zyme-Flow solution, and allowing the natural movement of the ship to provide the agitation.

2.Concentration/Application Rate:

The exact dilution of Zyme-Flow will vary between 50:1 and 200:1 depending on temperature, viscosity and type of petroleum product.

3.Conditions for Use:

Zyme-Flow is effective in all non-frozen waters with greater efficacy as the temperature increases. The product efficiency is not affected by salinity, but it will be affected by tar sand.

VII.a.TOXICITY

MATERIAL TESTED	SPECIES	LC50 (ppm)
ZYME-FLOW	Menidia beryllina	35 96-hr
	Mysidopsis bahia	26 48-hr
No. 2 Fuel Oil	Menidia beryllina	6.9 96-hr
	Mysidopsis bahia	3.7 48-hr
ZYME-FLOW and No. 2 Fuel Oil	Menidia beryllina	8.7 96-hr
	Mysidopsis bahia	1.6 48-hr
SDS (Reference toxicant)	Menidia beryllina	7.07 96-hr
	Mysidopsis Bahia	18.6 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

IX.PHYSICAL PROPERTIES

1.Flash Point: None

2.Pour Point: 32F

3.Viscosity: <10 cps

ZYME-FLOW

4. Specific Gravity: 0.99

5. pH: 7.0 - 8.0

6. Chemical Name and Percentage by Weight of the Total Formulation: CONFIDENTIAL

7. Surface Active Agents: CONFIDENTIAL

8. Solvents: Not applicable

9. Additives: CONFIDENTIAL

10. Solubility: Soluble

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

COMPOUND	CONCENTRATION (ppm)
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Arsenic	0.005
Cadmium	0.002
Chromium	0.002
Copper	0.020
Lead	0.007
Mercury	0.0004
Nickel	0.070
Zinc	0.040
Cyanide	0.300
Chlorinated Hydrocarbons	<1.00

TECHNICAL PRODUCT BULLETIN #M-19
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: APRIL 22, 1996
"WASTE-SET #3200®"

I.NAME, BRAND, OR TRADEMARK
WASTE-SET #3200®
Type of Product: Oil Spill Solidifying Agent

II.NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER
C.B Environmental Inc.
3374 West River Dr. NW
Grand Rapids, MI 49544
(616) 784-0770
FAX: (616) 784-5018
(Mr. Cal Blystra)

III.NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
C.B Environmental Inc.
3374 West River Dr. NW
Grand Rapids, MI 49544
(616) 784-0770
FAX: (616) 784-5018
(Mr. Cal Blystra)

IV.SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1.Flammability:

Product will not burn unless preheated. Avoid elevated temperatures (>200 F) for extended periods (>5 days).

Product has a tendency to accumulate a static charge during transport, which is a potential fire hazard if used near flammables.

2.Ventilation:

Avoid generating dust clouds.

3.Skin and eye contact; protective clothing; treatment in case of contact:

May cause mild mechanical irritation to eyes, skin and respiratory tract. Dust may cause coughing and watery eyes. Pre-existing eye, skin and respiratory disorders may be aggravated by this product. Wear NIOSH-approved respirator to prevent overexposure. Refer to transitional occupational exposure limits established by OSHA in 29CFR 1910.1000.

Flush eyes with water; wash skin with soap and water; if molten, treat as for burns. Remove person(s) to fresh air if excessive amounts of dust have been inhaled.

Protective gloves and safety glasses should be worn.

If material is released or spilled, sweep up or vacuum and place in an approved container.

WASTE-SET #3200®

- 4.a.Maximum storage temperature: 200 F
- 4.b.Minimum storage temperature: None
- 4.c.Optimum storage temperature range: <200 F
- 4.d.Temperatures of phase separations and chemical changes: >450 F

V.SHELF LIFE

Unlimited.

VI.RECOMMENDED APPLICATION PROCEDURE

1.Application Method:

Spills on Water

A. For spills on water, surround the spill with WASTE-SET® 3200 to prevent migration. Reinforce containment line with a boom or sweep if necessary. Waste-Set® and the resulting reacted material will float.

If the interior of the diked spill is not to be reclaimed, fill in the remaining surface area of the spill by broadcasting additional Waste-Set® 3200 evenly over the spill until the Waste-Set® no longer reacts with the spill. Alternatively, the product may be introduced under the surface of the spill to rise and react with oils in the suspension layer.

Waste-Set® can then be swept or netted from the surface of the water.

B. Spills on Hard Surfaces

For spills on hard surfaces, apply Waste-Set 3200® heavily to perimeter of spill to prevent migration. After surrounding the spill, reinforcement of the containment line thus formed with a boom or sweep may be advisable depending on the volume and flow rate.

If the interior of the diked spill is not to be reclaimed, fill in the remaining surface of the spilled material by evenly distributing additional Waste-Set 3200® until the Waste-Set® no longer reacts with the spill and remains white and on the surface.

C. Disposal

Dispose of reacted material in accordance with local, state, and federal regulation. Under the EPA Toxicity Characteristic Leaching Procedures (TCLP), Waste-Set encapsulated material may be eligible for disposal in landfills. Incineration results in extremely low ash content. Dependent upon the nature of the encapsulated material, it may also be disposed of by incorporation into synthetic surfaces such as asphalt.

Waste-Set® will effectively "encapsulate" crude oil and petroleum-based products, such as gasoline, kerosene, and diesel fuel; in addition to the various following liquid and vapor-phase contaminants:

Aliphatic hydrocarbons	Esters
Aromatic hydrocarbons	Ethers
Chlorinated hydrocarbons	Ketones
Alcohols	Other hydrocarbons

2.Concentration/Application Rate:

One pound Waste-Set® per five pounds of oil (May vary with viscosity and temperature).

3.Conditions for Use:

No limitations.

VII.a.TOXICITY

MATERIAL TESTED	SPECIES	LC50 (ppm)
WASTE-SET 3200®	Menidia beryllina	>10000 96-hr
	Mysidopsis bahia	5431 48-hr
No. 2 Fuel Oil	Menidia beryllina	274 96-hr
	Mysidopsis bahia	29 48-hr
WASTE-SET 3200® & No. 2 Fuel Oil	Menidia beryllina	552 96-hr
	Mysidopsis bahia	58 48-hr
SDS (Reference toxicant)	Menidia beryllina	1.8 96-hr
	Mysidopsis bahia	4.9 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

IX.PHYSICAL PROPERTIES

- 1.Flash Point: No flash observed at 310 F
- 2.Pour Point: Not Applicable
- 3.Viscosity: Not Applicable
- 4.Specific Gravity: 0.94
- 5.pH: Not Applicable
- 6.Chemical Name and Percentage by Weight of the Total Formulation: Confidential
- 7.Surface Active Agents: Not Applicable
- 8.Solvents: None
- 9.Additives: None
- 10.Solubility: Insoluble

X.ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

COMPOUND	CONCENTRATION (ppm)
Arsenic	N/D
Cadmium	N/D
Chromium	0.44
Copper	0.98
Lead	0.08
Mercury	N/D
Nickel	0.38
Zinc	3.1
Cyanide	N/D
Chlorinated Hydrocarbons	N/D

TECHNICAL PRODUCT BULLETIN #M-20
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: APRIL 22, 1996
"WASTE-SET #3400®"

I.NAME, BRAND, OR TRADEMARK
WASTE-SET #3400®
Type of Product: Oil Spill Solidifying Agent

II.NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER
C.B Environmental Inc.
3374 West River Dr. NW
Grand Rapids, MI 49544
(616) 784-0770
FAX: (616) 784-5018
(Mr. Cal Blystra)

III.NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
C.B Environmental Inc.
3374 West River Dr. NW
Grand Rapids, MI 49544
(616) 784-0770
FAX: (616) 784-5018
(Mr. Cal Blystra)

IV.SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1.Flammability:

Product will not burn unless preheated. Avoid elevated temperatures (>200 F) for extended periods (>5 days).

Product has a tendency to accumulate a static charge during transport, which is a potential fire hazard if used near flammables.

2.Ventilation:

Avoid generating dust clouds.

3.Skin and eye contact; protective clothing; treatment in case of contact:

May cause mild mechanical irritation to eyes, skin and respiratory tract. Dust may cause coughing and watery eyes. Pre-existing eye, skin and respiratory disorders may be aggravated by this product. Wear NIOSH-approved respirator to prevent overexposure. Refer to transitional occupational exposure limits established by OSHA in 29CFR 1910.1000.

Flush eyes with water; wash skin with soap and water; if molten, treat as for burns. Remove person(s) to fresh air if excessive amounts of dust have been inhaled.

Protective gloves and safety glasses should be worn.

If material is released or spilled, sweep up or vacuum and place in an approved container.

WASTE-SET #3400®

- 4.a.Maximum storage temperature: 200 F
- 4.b.Minimum storage temperature: None
- 4.c.Optimum storage temperature range: <200 F
- 4.d.Temperatures of phase separations and chemical changes: >450 F

V.SHELF LIFE

Unlimited.

VI.RECOMMENDED APPLICATION PROCEDURE

1.Application Method:

A. Spills on Water

For spills on water, surround the spill with WASTE-SET® 3400 to prevent migration. Reinforce containment line with a boom or sweep if necessary. Waste-Set® and the resulting reacted material will float. If the interior of the diked spill is not to be reclaimed, fill in the remaining surface area of the spill by broadcasting additional Waste-Set 3400® evenly over the spill until the Waste-Set® no longer reacts with the spill. Alternatively, the product may be introduced under the surface of the spill to rise and react with oils in the suspension layer. Waste-Set® can then be swept or netted from the surface of the water.

B. Spills on Hard Surfaces

For spills on hard surfaces, apply Waste-Set® 3400 heavily to perimeter of spill to prevent migration. After surrounding the spill, reinforcement of the containment line thus formed with a boom or sweep may be advisable depending on the volume and flow rate. If the interior of the diked spill is not to be reclaimed, fill in the remaining surface of the spilled material by evenly distributing additional Waste-Set® 3400 until the Waste-Set® no longer reacts with the spill and remains white and on the surface.

C. Disposal

Dispose of reacted material in accordance with local, state, and federal regulation. Under the EPA Toxicity Characteristic Leaching Procedures (TCLP), Waste-Set® encapsulated material may be eligible for disposal in landfills. Incineration results in extremely low ash content. Dependent upon the nature of the encapsulated material, it may also be disposed of by incorporation into synthetic surfaces such as asphalt.

Waste-Set® will effectively "encapsulate" crude oil and petroleum-based products, such as gasoline, kerosene, and diesel fuel; in addition to the various following liquid and vapor-phase contaminants:

Aliphatic hydrocarbons	Esters
Aromatic hydrocarbons	Ethers
Chlorinated hydrocarbons	Ketones
Alcohols	Other hydrocarbons

2.Concentration/Application Rate:

One pound Waste-Set® per five pounds of oil (May vary with viscosity and temperature).

3.Conditions for Use:

No limitations.

VII.a.TOXICITY

MATERIAL TESTED	SPECIES	LC50 (ppm)
WASTE-SET 3400®	Menidia beryllina	>10000 96-hr
	Mysidopsis bahia	>10000 48-hr
No. 2 Fuel Oil	Menidia beryllina	274 96-hr
	Mysidopsis bahia	29 48-hr
WASTE-SET 3400® &	Menidia beryllina	442 96-hr
No. 2 Fuel Oil	Mysidopsis bahia	36 48-hr
SDS (Reference toxicant)	Menidia beryllina	1.8 96-hr
	Mysidopsis bahia	4.9 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

IX.PHYSICAL PROPERTIES

- 1.Flash Point: No flash observed at 350 F
- 2.Pour Point: Not Applicable
- 3.Viscosity: Not Applicable
- 4.Specific Gravity: 0.91
- 5.pH: Not Applicable
- 6.Chemical Name and Percentage by Weight of the Total Formulation: CONFIDENTIAL
- 7.Surface Active Agents: Not Applicable
- 8.Solvents: None
- 9.Additives: None
- 10.Solubility: Insoluble

X.ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

COMPOUND	CONCENTRATION (ppm)
Arsenic	N/D
Cadmium	N/D
Chromium	0.41
Copper	0.97
Lead	0.08
Mercury	N/D
Nickel	3.3
Zinc	4.0
Cyanide	N/D
Chlorinated Hydrocarbons	N/D

TECHNICAL PRODUCT BULLETIN #M-22
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: FEBRUARY 27, 1998
REVISED LISTING DATE: OCTOBER 5, 1998
"PX 700™"

I.NAME, BRAND, OR TRADEMARK

PX 700™

Type of Product: Miscellaneous Oil Spill Control Agent

II.NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

National Resource Protection Corporation

2133 North Dixie Highway

Fort Lauderdale, FL 33305

(888) 633-6773

(954) 565-6148

(954) 565-2634 (FAX Number)

NRPC1@AOL.COM

(Frank Hughes)

III.NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

National Resource Protection Corporation

2133 North Dixie Highway

Fort Lauderdale, FL 33305

(888) 633-6773

(954) 565-6148

(954) 565-2634 (FAX Number)

NRPC1@AOL.COM

(Frank Hughes)

IV.SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1.Flammability: Not flammable; no special precautions necessary.

2.Ventilation: None required; no vapor emissions at normal temperatures, summer and winter.

3.Skin and eye contact; protective clothing; treatment in case of contact:

Product contains a surfactant; avoid prolonged skin contact. Mild eye irritant; in case of eye contact, flush with copious amounts of water. No protective clothing required. Contact treatment is to flush with water. Product is acidic (pH 3.5-4.0). Eye protection is recommended as a precaution against splashing.

4.a.Maximum storage temperature: 120 F

4.b.Minimum storage temperature: 30 F

4.c.Optimum storage temperature range: 65-85 F

4.d.Temperatures of phase separations and chemical changes: Separation may occur after 3 months.

PX 700™

Separation will not affect product performance.

V.SHELF LIFE

Two years.

VI.RECOMMENDED APPLICATION PROCEDURE

1.Application Method:

To remove oily sheen from areas surrounding an oil spill, spray undiluted PX-700™ directly over area at an application rate of one gallon for every 900 to 1200 square feet of surface area. Dilute PX-700™ 25:1 for cleaning equipment and other surfaces. Either spray or immerse equipment, as applicable. Dilute PX-700™ 50:1 for immersing wildlife to remove oil.

2.Concentration/Application Rate:

At normal temperatures product is free flowing and applied full strength to remove oily sheen from aquatic environments, soils, and wastewater.

3.Conditions for Use:

Water salinity, water temperature, types and ages of pollutants. Do not allow product to freeze, as separation may occur. Product may work more slowly at low temperatures. At full strength or diluted with fresh water, product will have a specific gravity lower than sea water and should float. Use of PX-700™ should aid skimming and other conventional oil recovery operations.

VII. TOXICITY AND EFFECTIVENESS

1. Toxicity

	SPECIES	LC50 (ppm)
PX-700™	Menidia beryllina	380 96-hr
	Mysidopsis bahia	297 48-hr
No. 2 Fuel Oil	Menidia beryllina	7.07 96-hr
	Mysidopsis bahia	1.89 48-hr
PX-700™ & No. 2 Fuel Oil (1:10)	Menidia beryllina	5.65 96-hr
	Mysidopsis bahia	2.77 48-hr
Reference toxicant (DDS)	Menidia beryllina	6.16 96-hr
	Mysidopsis bahia	23.0 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

2.Effectiveness

Not applicable.

IX.PHYSICAL PROPERTIES

1.Flash Point: Not flammable

2.Pour Point: 30 degrees F

3.Viscosity: Equivalent to water

4.Specific Gravity: 1.0

5.pH: 3.5 to 4.0 standard units

6.Chemical Name and Percentage by Weight of the Total Formulation: CONFIDENTIAL

7.Surface Active Agents: Less than 5% Cocamide

8.Solvents: None

9.Additives: Citric acid for pH control

10.Solubility: 100% soluble

X.ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

COMPOUND	CONCENTRATION (ppm)
Arsenic	0.47
Cadmium	BDL*
Chromium	BDL
Copper	0.14
Lead	BDL
Mercury	BDL
Nickel	BDL
Zinc	0.77
Cyanide	BDL
Chlorinated Hydrocarbons	CONFIDENTIAL

* Below Detectable Limits

TECHNICAL PRODUCT BULLETIN #M-23
USEPA OIL PROGRAM CENTER
ORIGINAL LISTING DATE: 11/23/98
"ALSOCUP"

I. NAME, BRAND, OR TRADEMARK

ALSOCUP

Type of Product: Miscellaneous Oil Spill Control Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

Alsocup

P.O. Box 488

Yorba Linda, CA 92886

(714) 490-1613

(Mr. John Webb)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

Pending approval there are no current distributors or sales outlets.

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1.Flammability: Not applicable

2.Ventilation: Not applicable

3.Skin and eye contact:

Alsocup is practically non-irritating to the eyes and is non-irritating to the skin. Safety glasses and protective clothing should be worn when applying the material. The product is not expected to cause irritation to the nose, throat, or respiratory tract.

4.a.Maximum storage temperature: 163 F

4.b.Minimum storage temperature: 0 F

4.c.Optimum storage temperature range: 0 F to 163 F

4.d.Temperatures of phase separations and chemical changes: Not applicable

V. SHELF LIFE

Alsocup has a shelf life of five years.

VI. RECOMMENDED APPLICATION PROCEDURE

1.Application Method:

Alsocup is used to collect petroleum-based products spilled on water or land. When Alsocup comes into contact with a petroleum product it chemically bonds and traps the petroleum. Once captured, spilled product cannot be released from Alsocup. Alsocup does not absorb water and will not sink. The product can be collected by skimming with pumps or mechanical devices.

ALSOCUP

2. Concentration/Application Rate:

Alsocup is used by applying one pound of product to each 10 pounds of spilled petroleum products.

3. Conditions for Use:

Water temperature does not appear to affect the ability of Alsocup to collect petroleum products. Heavy seas may prevent containment of an oil spill, and the product would lose efficiency if the oil product dispersed. Booms and dams that contain the petroleum product into an area are most effective when using Alsocup. In water the motion of the sea will mix the product with oil. On land a mechanical means is necessary to combine the oil with Alsocup. Alsocup will collect petroleum products at any stage; however, it is most effective early in the spill before dispersion.

VII. TOXICITY AND EFFECTIVENESS

1. Toxicity:

Alsocup is a non-toxic substance. The product is generally considered to have a low order of acute oral toxicity.

	SPECIES	LC50 (ppm)	
ALSOCUP	Menidia beryllina	>100	96-hr
	Mysidopsis bahia	>100	48-hr
No. 2 Fuel Oil	Menidia beryllina	8.1	96-hr
	Mysidopsis bahia	3.9	48-hr
Alsocup & No. 2 Fuel Oil	Menidia beryllina	14.0	96-hr
	Mysidopsis bahia	10.0	48-hr
Reference Toxicant (DSS)	Menidia beryllina	Not applicable	96-hr
	Mysidopsis bahia	Not applicable	48-hr

VIII. MICROBIOLOGICAL ANALYSIS

Not applicable

IX. PHYSICAL PROPERTIES

1. Flash Point: Not applicable
2. Pour Point: Not applicable
3. Viscosity: Not applicable
4. Specific Gravity: Not applicable
5. pH: Not applicable
6. Surface Active Agents: Not applicable
7. Solvents: Not applicable
8. Additives: Not applicable
9. Solubility in Water: Not applicable

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

COMPOUND	CONCENTRATION (ppm)
Arsenic	0.0211
Cadmium	0.090
Chromium	0.456

ALSOCUP

Copper	0.445
Lead	0.454
Mercury	0.00492
Nickel	0.474
Zinc	0.433
Cyanide	N/D
Chlorinated Hydrocarbons	Not applicable

ALSOCUP

TECHNICAL PRODUCT BULLETIN #M-24
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: JANUARY 26, 2001
REVISED LISTING DATE:
"RAPIDGRAB 2000™"

I. NAME, BRAND, OR TRADEMARK

RapidGrab 2000™

Type of Product: Miscellaneous Oil Spill Control Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

Van Waters and Rogers/Vopak

4600 Dues Dr.

Cincinnati, OH 45246-1009

(513) 874-0970 (Manufacturer Fax Contact Barbara Thompson)

(937) 643-1796 (Sales Contact Mike Peterson)

(937) 643-1861 (Sales Fax)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

GlobeMark Resources Ltd.

7 Collingwood Ave.

Dayton, OH 45419

(937) 643-1796

Fax: (937) 643-1861

(Mike Peterson/Joannie Doctor)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability:

IMO - Non-flammable; DOT - Non-hazardous

2. Ventilation:

Use with ventilation equal to unobstructed outdoors in a moderate breeze.

3. Skin and eye contact; protective covering; treatment in case of contact:

Avoid skin and clothing contact. If skin contact occurs, immediately wash with large amounts of water and soap (if possible). Remove any contaminated clothing or shoes. Launder before reusing. If irritation persists, seek medical assistance. For areas where contact is likely, wear long sleeve shirt, chemical resistant gloves, and chemical resistant goggles.

4.a. Maximum storage temperature: 120°F

b. Minimum storage temperature: 0°F

c. Optimum storage temperature range: 32°F to 90°F

d. Temperatures of phase separations and chemical changes: None

RAPIDGRAB 2000™

V. SHELF LIFE

The shelf life of unopened drums of RapidGrab 2000™ is unlimited. Containers should be capped when not being used to prevent contamination and evaporation.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method:

RapidGrab 2000™ is a non-ionic liquid formulation that may be effectively applied by mist spraying onto floating oil slicks and sheens that are often found in harbors and at sea as the result of oil leakage and spills from ships. It instantly reduces and confines floating oils by the oleophilic synergistic effect of contraction and congealment into a physical state that greatly simplifies cleanup operations. Oil slicks and sheens may be reduced by up to 1,000 percent or more. The broad temperature range for RapidGrab 2000™ sprays are from 32°F to 120°F.

Aerial Spraying - Typical application altitudes of 30 to 50 feet are advised although higher altitudes may be used if condition warrant. Spray nozzle should be about ¼ inches in diameter at 104 knots or more to create enough air shear sufficient to break the RapidGrab 2000™ into proper sized droplets. A ½-inch diameter nozzle may be needed for temperatures below 50°F.

Boat Spraying - Mist sprays may be applied from shipboard by power “foggers.”

2. Concentration/Application Rate:

RapidGrab 2000™ should be mist sprayed full strength on surface oil until sufficient herding results are achieved. Results will vary depending on oil type, temperature, wave action, and viscosity.

3. Conditions for Use:

RapidGrab 2000™ is designed to be used after oil has been contained by booms or other similar apparatus. Timely treatment with RapidGrab 2000™, even at low application rates, can help to contain the sheen/spreading effect of the oil slick.

VII. TOXICITY AND EFFECTIVENESS

1. Toxicity

MATERIAL TESTED	SPECIES	LC50 (ppm)
RapidGrab 2000™	Menidia beryllina	5.13 96-hr
	Mysidopsis bahia	2.29 48-hr
No. 2 Fuel Oil	Menidia beryllina	9.34 96-hr
	Mysidopsis bahia	3.12 48-hr
RapidGrab 2000™ & No. 2 Fuel Oil (1:10)	Menidia beryllina	4.07 96-hr
	Mysidopsis bahia	2.60 48-hr
Reference Toxicant (SRTT)	Menidia beryllina	2.97 96-hr
	Mysidopsis bahia	6.71 48-hr

VIII. MICROBIOLOGICAL ANALYSIS

Not applicable.

IX. PHYSICAL PROPERTIES

1. Flash Point: 110°C

2. Pour Point: 30°F

RAPIDGRAB 2000™

3. Viscosity: 20.2
4. Specific Gravity: 0.84
5. pH: 6.95
6. Surface Active Agents: Oleophilic surfactant
7. Solvents: Proprietary formulation oleophilic surfactants
8. Additives: None
9. Solubility in Water: Miscible in oil and solvents

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

COMPOUND	CONCENTRATION (ppm)
Arsenic	ND
Cadmium	ND
Chromium	ND
Copper	ND
Lead	ND
Mercury	<0.1
Nickel	ND
Zinc	ND
Cyanide	2.8
Chlorinated Hydrocarbons	ND